807.

REPORT

FROM

COMMITTEE

ON

HOLYHEAD ROADS.

Ordered, by The Houſe of Commons, *to be printed,*
30 *May* 1811.

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R E P O R T.

The COMMITTEE appointed to enquire into the State of the Road from *Shrewſbury* to *Holyhead*, into what Improvements or Alterations may be deſirable and practicable therein for the convenience of Travellers, and into the State of the Funds ariſing from the Turnpikes thereon, and their Expenditure; and to report the ſame, with their obſervations and opinion thereupon, to the Houſe;—and who were inſtructed to extend their enquiries to the Road leading from *Cheſter* to *Holyhead*; and alſo to examine into the manner and time in which the Mail is conveyed from *Holyhead* to *London*; and were empowered to report, from time to time;——Have proceeded, in purſuance of their Inſtructions, to enquire into the State of the Roads leading from *Shrewſbury* to *Holyhead*:—And

YOUR Committee find, That the preſent ſtate of that Road is conſiderably worſe than it was when a Report on this ſubject was made by a Committee appointed during the laſt Seſſion of Parliament, and Your Committee are of opinion, that unleſs conſiderable public aid is afforded, this Road will in time become impaſſable, as the preſent Funds are entirely inadequate for the purpoſe of keeping it even in tolerable Repair, inaſmuch as it appears by reference to the Appendix to the Second Report of that Committee, that the Tolls collected in the year 1810, on the whole line of Road from Shrewſbury to Holyhead, after deducting the Intereſt of Money borrowed by the reſpective Truſts, did not amount to more than £. 2,899. a ſum which appears to Your Committee entirely incompetent to keep in repair an extent of 109 miles of the Great Road, beſides a very conſiderable extent of Croſs Roads branching therefrom.

The former Committee have ſo fully pointed out the advantages to be derived from giving every practicable degree of facility to the communication between the two Iſlands of the United Kingdom, that Your Committee feel it unneceſſary to dwell upon this part of the ſubject, farther than to ſtate, that they fully coincide in the opinion formed by that Committee; their duty they conceive will be to point out ſpecifically the Improvements moſt eligible to be adopted, which the former Committee were unable to do, " in conſequence of their not having had ſufficient authenticated documents, nor any general connected plans of theſe Roads, made by profeſſional Engineers or Surveyors:" Your preſent Committee, however, are enabled to form an opinion on this part of the ſubject, inaſmuch as the Lords Commiſſioners of His Majeſty's Treaſury, ſhortly after the Report preſented by the late Committee, gave directions to Mr. Telford, an Engineer of great eminence, to make an accurate ſurvey of theſe Roads, to point out the ſhorteſt and moſt level line that could be had between Shrewſbury and Holyhead, and alſo to conſider the beſt mode of paſſing the Streight called *The Menai*, and to eſtimate the expenſe attending the execution of ſuch Plan.

Mr.

Mr. Telford proceeded without delay to execute their Lordſhips orders, and it appears from his teſtimony, that ſeveral trial ſurveys were made under his ſuperintendence, by Surveyors who had been accuſtomed to make ſurveys in hilly countries; that after the ſurveys were made, he compared them again with the lines of the country, and repeatedly examined whether in any points they could be improved; that he took ſurveys and ſections, one of which was taken of the preciſe ſtate of the preſent Road, as faithfully as levels could make it; the other was taken of the propoſed lines by ſimilar means, and faithfully compared together; from theſe ſurveys and ſections he made detailed drawings and minute calculations of the expenſe, the reſult of which he preſented in a Report to their Lordſhips, accompanied with a general Map, Plans, and Drawings.

Plate I. Your Committee called for this Report, which together with the Map and ſuch Plans as ſeemed neceſſary to explain and illuſtrate it, will be found
Appx. No. 2. in the Appendix annexed to this Report.

Upon an attentive conſideration of all the documents and evidence before Your Committee, and of the Report of the former Committee, it appears to them,—

That the diſtance from Shrewſbury to Holyhead, by the preſent Road, is 109 miles:

That by the propoſed Line it will be but 105 miles; ſo that there would be a ſaving in diſtance, four miles:

That the preſent Road is carried unneceſſarily over many hills, and that the aſcents and deſcents are often one foot in height to fourteen in length; one in ten, one in eight, and even one in ſeven:

That there will not be any inclination of aſcent or deſcent in the propoſed plan above one in thirty, and ſuch only in very few places; and for ſhort diſtances, the general inclination being much leſs than that proportion:

That if the propoſed Line be adopted, there will ſcarcely be to be found in any part of the kingdom, the ſame length of equally level Road, through a country ſo incumbered by mountains:

That the preſent Road is univerſally too narrow, being in many places, for a conſiderable diſtance, not wider than fifteen feet:

That the breadth of the propoſed Line is forty feet, except in ſome parts along the ſides of very ſteep hills, where it diminiſhes to thirty feet; but is not narrower in any place.

Your Committee are of opinion, that the Road ſhould not be narrower than forty feet, inaſmuch as it allows eighteen feet to be gravelled in the centre, and leaves a ſpace of eleven feet on each ſide as a ſummer Road, to the great eaſe of travellers; and thereby the wear of the gravel, in a dry ſeaſon, is conſiderably prevented.

Your Committee have no reaſon to doubt, that if the propoſed Line were effected, the Mail Coach could travel upon it from Shrewſbury to Holyhead with equal expedition as on any other Road, in about fourteen hours; whereas the time now allowed is ſeventeen hours and a half; which is not only often exceeded, but various accidents frequently occur by the drivers endeavouring to keep within that time.

That a ſaving of three hours and a half may often prove a ſaving of twenty-four hours in the arrival of the Iriſh Mail in London; becauſe in ſuch caſe the Mail need not be diſpatched from Holyhead for ſo many hours later in each day, which will allow ſo much additional time for the arrival at Holyhead of the Packet from Dublin.

That

That the advantage of diminiſhing the rates of aſcents and deſcents, tends not only to the expedition and eaſe of the traveller, but to the conveyance of goods and merchandize; many of which, in the intercourſe between Great Britain and Ireland, are of a nature wherein diſpatch and certainty of delivery are of the utmoſt conſequence; and it appears to Your Committee, an Eſtabliſhment for ſuch conveyance has been attempted, but that the Proprietors were obliged to abandon it, in conſequence of the ſteep aſcents and bad ſtate of the Roads.

That the paſſage of Bangor Ferry, by a boat, acroſs the Menai, is at all times inconvenient, often dangerous, and ſometimes impracticable from the ſeverity of the weather.

That Your Committee fully coincide in opinion with the late Committee, that "a Bridge acroſs the Menai is not only expedient, but neceſſary to "the free communication between Great Britain and Ireland, and ought "immediately to be conſtructed:" For this purpoſe Mr. Telford has propoſed two Plans, the one for croſſing the Menai at Ynys y Moch, and the other at the Swilly Rocks. Upon comparing theſe Plans ſuggeſted by Mr. Telford, with thoſe laid before the former Committee, and fully conſidering the circumſtances attending each Plan, Your Committee recommend the adoption of that which croſſes the Streights at Ynys y Moch, inaſmuch as they are fully convinced its adoption can in nowiſe endanger veſſels navigating thoſe Streights, nor interrupt the navigation even during its conſtruction; for Mr. Telford, by a very ingenious contrivance, propoſes to ſuſpend the centring and ſcaffolding, inſtead of ſupporting them from the bottom. The manner in which he propoſes to effect this, will be ſeen by referring to his Report and Plan in the Appendix. The further reaſons which have induced Your Committee to give this Plan a preference are, that the eſtimated expenſe is much leſs than that of any of the other Plans:—That the narroweſt part of the Streights is choſen for its ſcite; and that there are large and high banks of rock on each ſide, immediately adjoining, for ſupporting the abutments and ſecuring them againſt the preſſure of the arch, at the ſame time that the contiguity of ſuch high ground will render the approaches leſs expenſive.

Plate II.
Plate III.
Plate II.
Plate II.

Some apprehenſions appear to have been entertained by the Inhabitants of the town and port of Carnarvon, that the erection of a Bridge of any deſcription may deſtroy the navigation of the Menai; and ſeveral witneſſes have been examined both before Your preſent and the former Committee on this ſubject; however, upon maturely conſidering the evidence on both ſides, Your Committee are of opinion that the weight of evidence is decidedly againſt ſuch an apprehenſion.

Appendix, No. 1.

Moſt if not all of the witneſſes who entertain this apprehenſion, are perſons who, whatever local knowledge they may have, ſeem to Your Committee altogether incompetent to form a judgment of the effects likely to reſult from the erection of a Bridge, ſuch as that propoſed, which muſt depend much more on general principles than local knowledge; and it appears from the teſtimony of Mr. Rennie and Mr. Telford, both Engineers of acknowledged ability, of Admiral Bentinck, and Captain Huddart, an elder brother of the Trinity Houſe; of Captain Jones, who was thirty years in the Navy, and was perfectly acquainted with the navigation of the Menai, from having commanded a cutter of Lord Uxbridge's for ſeven years; and of Mr. Williams, a Member of the Committee, who has been in the habit of ſailing through theſe Streights three or four times a week in the ſummer ſeaſon for the laſt fifteen years, that no injury to the navigation could reſult from the erection of the propoſed Bridge.

Ibid.

The Expenſe attending an undertaking of ſuch magnitude muſt of courſe be conſiderable; but when the object in view is of ſuch extreme importance as that of rendering the communication between the two Iſlands of the United Kingdom ſafe and expeditious; of allowing a quicker and more certain arrival of the Mail in London from Dublin; and of facilitating the acceſs at all times of the Inhabitants of Ireland to the ſeat of their Government, the Parliament, and the Court of Appeals; Your Committee beg leave to recommend, in the ſtrongeſt manner, to the ſerious and immediate conſideration of The Houſe, the adoption of ſuch meaſures as may give to the Public the benefit of the propoſed Plan.

That it appears to Your Committee, that if an apprehenſion with any colour of reaſon could be entertained, that the erection of the propoſed Bridge over the Menai would prove injurious to the navigation of thoſe Streights, it would be entirely removed by cutting away ſome of the moſt dangerous rocks that lie in that narrow paſſage, a Plan and Eſtimate of which work has been laid before Your Committee, and will be found in the Appendix; and although this ſubject may poſſibly not come preciſely within the words of the inſtruction to Your Committee, yet they do not heſitate to recommend its adoption; as, were this work executed, the benefit which would reſult therefrom would effectually remove any inconvenience to be apprehended from the erection of the propoſed Bridge.

Plate V.

Mr. Telford has ſuggeſted ſeveral important improvements on the Line from Cheſter to Bangor, through the towns of Holywell, Rhyddland, and Conway; and has laid before Your Committee the Plans and Eſtimate of a Bridge acroſs an arm of the Sea at the laſt-mentioned place, hereunto ſubjoined.

It further appears to Your Committee that the paſſage of the preſent Ferry at Conway is attended with ſerious inconveniences, much delay, occaſional danger, and even actual loſs of lives; they therefore beg leave to recommend the erection of a Bridge there, according to Mr. Telford's Plan; and Your Committee entertain a confident expectation, that the adoption of this meaſure will afford ſuch encouragement to the exiſting Truſts, that very conſiderable improvements will be undertaken by the preſent Truſtees out of their own funds, in the event of its being carried into execution.

30 *May* 1811.

APPENDIX.

No. 1.

MINUTES OF EVIDENCE.

Mr. Thomas Telford	- pp. 7. 17.	Admiral Bentinck	p. 16.
— William Jones	- pp. 8. 22.	John Thomas	p. 18.
Captain John Jones	p. 11.	Owen Williams, Esq. (a Member)	p. 21.
Mr. Lewis Owen	p. 15.		

Martis, 30° *die Aprilis*, 1811.

Committee on Holyhead Roads.

Right Honourable JOHN MAXWELL BARRY, in the Chair.

Mr. *Thomas Telford*, called in; and Examined.

Mr. Telford.

HAVE you made any Survey of the Line of Road from Holyhead to Shrewsbury?——I have, in consequence of an Order I received from the Treasury through Mr. Harrison, dated the 4th of May, the general tenor of which was, that, without paying any regard to Towns, Inns, or private intereſts, I was to lay out the ſhorteſt and eaſieſt lines of Road that the country was capable of receiving, and also to consider of the beſt mode of passing the ſtreight, called The Menai; in consequence of which, I perambulated the country twice, and pointed out the several trial surveys, and finally the surveys were taken by two persons whom I brought from Scotland for that purpose, in order to avoid all connexions of partialities, and who had been accuſtomed to make similar surveys in hilly countries. I attended them frequently, and pointed out the precise lines that seemed to me to be moſt in conformity with my Inſtructions, both with regard to the Roads, and passing the Menai. After the surveys were made, I compared them with the lines in the country, and repeatedly examined, whether in any points they could be improved; in some I found they could, which were adopted; but generally the surveys were as correct as I could wiſh. From those surveys and sections, one of which was taken of the precise state of the present Road as faithfully as levels and surveys could make it, the other of the proposed lines by similar means, and faithfully compared together; from those surveys and sections I made out detailed drawings and minute calculations of the Expense; and all those surveys of different lines I eſtimated from similar data, where circumſtances would admit of it. The result of this is given in a Report which I delivered to the Treasury, accompanied with general Maps and Drawings.

Have you examined the ſtate of the present Road in the Island of Anglesea with a view to improving it?——I have.

Have you ſuggeſted any thing with a view to the improvement of that Road? ——I have not.

For what reason?——The reasons, I think, will appear obvious, when you compare it with the principles of my Inſtructions, that I was to lay out the ſhorteſt and eaſieſt line of Road the country was capable of receiving, without regard to Towns, Inns, or private intereſts; the leading points of the present line of Road lie from two to two and a half miles at leaſt north of a direct line drawn between the present ferry of Bangor and Holyhead; the ridges of the country running north and south, the Road generally crosses them at right angles; the country to the north of the present line rises ſtill higher, and generally declines to the southward: it was therefore evident to me, that to get lower summits, it would

Mr. Telford. would be absolutely necessary to proceed towards the south; and in doing which, I was coming more in a direct line between the two extreme points. The higheſt ridge, where the Road crosses, is to the eaſtward of Llangefni: I examined that ridge with great care, and found no pass in it, but the one I have adopted, which is 160 perpendicular feet below the level, where the present Road crosses; and this being in a more direct line than the present Road, was a leading inducement for me to adopt it; besides that, upon carefully examining the ſtate of the present Road, what from the continued waving surface over which it passes, the narrowness of the Road, and its awkward bendings, it appears to me, that to render it a Road conformable to the Inſtructions laid down to me as to breadth and perfection, it would require to be wholly new made; therefore, whether it regards the length of the Road, the ease of inclinations, or the expense, there did not seem one object to lead me from making a new line. To bring the old line to the inclinations laid down in my Inſtructions, and to touch at the village of Llangefni, and the Inn of Gwyndy, it muſt be greatly increased in length, because it passes over higher and more frequent summits.

What diſtance do you propose to save by this new line of Road from point to point?——About three miles.

You recollect a point of the old Road coming from Bangor Ferry, ſtraight up to what is called Lady Stanley's Sands?——Yes.

Supposing an embankment carried in a direct line from that point, what difference would there be between the new line proposed in point of diſtance, and the old Road, supposing the old Road so improved?——About two miles.

Do you conceive such an embankment practicable?——I ſhould not recommend it to be attempted.

Do you think it practicable?——I will not say it is impracticable, but the expense would be considerable, and the exposure to the sea would be very great, and very dangerous; the expense would be much more than would be gained.

Have you accurately viewed that spot under that consideration?——I examined it with a view to see whether that embankment was advisable to be recommended, and it appeared to me so much out of the queſtion, that I never thought of measuring it; for by adopting the present plan, I got an embankment that was practicable at a moderate expense, and in a direct line between the extreme points.

Do you think any thing could be done to reduce the hills and cut off angles in the present Road, without altering the line, putting the width of the Road out of the queſtion?——I imagine that the leading features in a Road are inclinations, viz. rises, and falls; to bring the present Road to an inclination of 1 in 30, which is the extreme one I mean, I think nearly the whole of the Road muſt be varied. When once you vary the line of the Road wholly, certainly you would never think to make it so narrow as it is at present; it therefore seems to me, after carefully considering it, that to make that Road agreeable to my Inſtructions, you muſt alter it wholly, and so incur the whole expense; and that therefore it is desirable to take a better line. It would be like a man repairing an old house, in which more expense is frequently incurred, than in building a new one on a better plan.

Mercurii, 1° *Maii,* 1811.

Right Honourable J. M. BARRY, in the Chair.

Mr. WILLIAM JONES called in; and Examined.

Mr. Jones. HAVE you any Plans by which the old Road could be ſhortened and improved through the Island of Anglesea?——Yes, I have.

[Here the Witness was desired to produce the Plan he alluded to, which he did.]

What difference does it make in the diſtance between Bangor Ferry and Holyhead by the proposed Plan?——Two miles and 60 yards.

Are any of the hills avoided?——The moſt of the hills, except Penmynydd Hill.

Mr. Jones.

Do you avoid the hill at Koynt?——The same Road hollows, but it is proposed to take off the hollow by raising it, and taking off 10 feet of bank.

To what will you reduce the acclivity on each side?——To a very easy pull; rather a little more than one inch to a yard, or one in 36.

How have you ascertained that?——By levels I took in that spot, and most spots on the Road; I took levels to ascertain the declivity.

Have you made a Plan of the Road?——I did make a Plan, but not of the whole Road, only in those places where it was necessary to use the Road.

In how many places did you take the declinations?——At Koynt and Penmynydd.

Did you take the declination at any other places?——No, only in those two places where I endeavoured to ease the hill, in order to ſhorten the Road.

Do not you think there are several other hills necessary to avoid, or reduce?——Yes, there are; I have endeavoured to represent upon this Plan the mode of avoiding them.

I am to underſtand you to say, that in every case you worked only by the eye, or merely by view of the declination?——Yes.

Can you state to the Committee what the greateſt degree of declination would be from Holyhead to Bangor, according to your Plan?——According to my Plan it is all nearly upon a level, except upon the rising of Penmynydd; as nearly as the country admits.

Do you go to the north or south of the present Road?——All to the south, except in one inſtance.

What is the state of the present Road?——Some part is in good repair, some is under repair.

I mean as to the line; do you hold it to be inconvenient?——In some places it is; there are hillocks up and down.

By going to the southward in a new line, would not you avoid, in a great degree, all the inconvenience of the old line?——In some places.

I mean generally?——Anglesea is a flat country altogether, although towards the eaſt it is more hilly; but towards the weſt it is more level in all directions.

Have you seen the line laid out by Mr. Telford?——No, I have not; but I know the country well. I have made a pencil line upon the Plan.

Is not that considerably lower where it intersects the ridge of hills; is it not lower considerably than the present line?——Yes, it is lower, and considerably lower near Penmynydd Hill.

Do you know what is the elevation of the highest point of the line you have surveyed over the level of the sea?——No, I do not know.

Do not you imagine that the higheſt point of the line you have surveyed is considerably higher than that surveyed by Mr. Telford?——Yes, it must be so; I have tried it, it is very hollow; it falls towards that spot, and then rises towards Newbury.

Do you conceive that the loweſt spot where that ridge of hills could be crossed?——Yes, it is.

Is it the only one?——I do not know of any that is lower than it.

Do you think that the country to the southward, or northward, is the higheſt?——To the Northward it is higher in general.

Can you take upon yourself to ſtate what the greateſt degree of inclination of the line you have surveyed would be?——I cannot say.

Have you made any calculation of the expense?——I have made an Eſtimate.

[Here the witness produced an Eſtimate of the Expense of making the new Cuts of Road represented in the Plan of the Turnpike Road from Bangor Ferry to Holyhead, which was read to the Committee.]

In your Eſtimate, have you included any improvements of the old Road, that part of the old Road that will remain?——No, not at all; that Eſtimate is only for the new Cuts; it does not take the remainder of the present Roads; it is not for the improvement of the old Road.

What breadth have you laid out those Cuts at?——At 21 feet, except at the Embankment.

What breadth of the 21 feet do you propose to gravel?——I proposed there ſhould be 21 feet of gravel.

Then you bring the gravel home to the fence, you gravel the whole of it?——Yes.

Mr. Jones. In your Eſtimate, have you included the purchaſe of the lands that will be occupied by the new Cuts?——No.

Is the Embankment included in your Eſtimate?——Yes.

Does not that part of the Road that would remain, excluſive of the new Cuts, require repair?——Yes, they want repair, they are under repair.

Is it very narrow in ſeveral places?——In ſome places it is leſs than 21 feet, in many places it is of that breadth; in ſome places it is very broad; it is not of a regular breadth from beginning to end.

I want to know whether you have calculated the expenſe of making the preſent Road as good as you would make the Cuts you have put down in the Eſtimate?——I have not put down the old Road in the Eſtimate; I have no gueſs of the expenſe.

Do you think that as much more as you ſtate for the expenſe of making the new Cuts, would make the improvements upon the Road?——Another £. 4,000.

Do you think that double the ſum would be ſufficient to repair the old Road?——I think it would; another £. 17,000. would render it totally complete.

Did not you ſay that you had examined another line of Road that you thought would be preferable to the preſent one?——There are many places that I looked at; but I did not ſurvey it.

Do you believe that the line laid out by Mr. Telford is the beſt and eaſieſt line of communication that the country affords between Holyhead and Bangor?——I have no doubt that it is more level.

And as to its being the moſt direct line, what is your belief?——I do not know I am ſure; he croſſes the Stanley Sands; I cannot ſay any thing at all againſt it.

Do you not think it is the moſt direct and the moſt level line in the whole Iſland, ſuppoſing there were no obſtructions?——I do not believe it is; I think he has gone too far Southward.

Do you conceive that by going ſo far to the Southward you croſs any hills beſides that mentioned, which you could avoid by going farther to the Northward?——Taking the advantage of the loweſt part that Mr. Telford has drawn of the Penmynydd Hills, I am of an opinion, that in croſſing the Embankment by Lady Stanley's Sands, a line more Northward than that of Mr. Telford would be as flat, and as good.

Upon what do you found that opinion?——Becauſe that the ground is as flat, and that the materials are better, taking the North ſide of Gwalchny Mountain in hand.

How did you aſcertain the ground to be as flat?——By viewing the ground, and having been upon it many times.

But not from any ſurvey?——No; not from any ſurvey.

And I ſuppoſe, that without a ſurvey, you could not poſitively aſcertain that to be the caſe?——I have taken notice ſeveral times during the ſurvey of the Road, but never ſurveyed that particular ground; I have ſurveyed moſt part of it for Gentlemen, but not for this ſurvey.

If you thought that a more eligible line, why did not you lay it down in your Map?——I was ordered to keep the preſent Road in hand as much as poſſibly I could.

You ſay by taking a line more to the Northward, you would get land as low as Mr. Telford, would not that be keeping too far North of the ſtraight line from Bangor to Holyhead?——I am not very ſure; but I think it is not too far North in point of flatneſs and materials.

Is the line you propoſed North of the preſent Road, excepting in one place?——It is Southward of the preſent Road, excepting in one place.

If I underſtand you right, then, your Eſtimate for improving the preſent line to the width of 21 feet, would amount to about £. 34,000.?——Yes; I think that doubling the preſent ſum would make the preſent Road, and the remainder of the Road from Bangor Ferry to Holyhead complete, and to be a Road of 21 feet breadth.

As complete as Mr. Telford's?——I do not ſay as to Mr. Telford's.

Do you conceive that any difference as to the materials exiſt upon the different lines of Road?——The more to the North the materials are better and harder.

And do you conceive that the materials are worſe upon the line of Mr. Telford than the preſent line?——Indeed I am not ſure of the whole.

Generally

Mr. Jones.

Generally speaking?——No; I do not believe they are so good by his line as the preſent; they are ſofter and worſe; there are more ſandy ſubſtances; it is ſandy ground; loomy, with no rocks nor ſuch like materials, and very little gravel.

[Here the Witneſs produced a Plan of the Road from Holyhead to Bangor Ferry, and alſo a Plan and Section at Glaſsmavin, drawn by himſelf.]

Veneris, 10° die Maii, 1811.

Right Honourable JOHN MAXWELL BARRY, in the Chair.

Captain *John Jones* called in; and Examined.

Capt. J. Jones.

HAVE you been bred to the ſea?—Yes; from my infancy.

What ſort of veſſels have you had the command of?—I have commanded veſſels from 30 tons burthen to 250.

Are you converſant with the navigation of the Straits of Menai, and particularly of the Swillys?——Yes.

Have you ſeen a plan of the bridge propoſed to be built by Mr. Telford, from the Carnarvon Shore to the Rock called *Ynys-y-Moch?*——Yes; I have ſeen ſuch a plan.

I wiſh you to ſtate what effect you ſuppoſe ſuch a bridge would have upon the navigation of this Strait?——It will be moſt injurious, if not deſtructive of the navigation of the Strait.

Can you ſtate any particular reaſons for your forming that opinion?——It will, by the immenſity of the works, create eddy and baffling winds, and the eddy tide correſponding to the immenſity of the work, will cauſe veſſels to be becalmed by the current of wind being diverted from its proper channel.

If the abutments were built below the high-water mark, would they be injurious to the navigation?——Yes, they would.

Has any veſſel of large burthen lately paſſed through the Straits of Swilly?——Yes

What veſſel was it?——An American ſhip from Liverpool, bound to New Providence in Rhode Iſland.

Do you recollect what her burthen was?——I cannot exactly ſay; but it was ſomething from about 300 or upwards, regiſter tonnage; it was between 300 and 400 tons.

Do you know the name of the veſſel?——I have forgot the name, but I believe Colonel Smith knows it.

What height did you ſuppoſe the maſt of that veſſel might be?——We were particular enough to meaſure the height, but I really did not take notes; but to the beſt of my recollection it was from 130 to 140 feet from the ſurface of the water to the top of the maſt-head.

Was ſhe laden or not?——She was partly laden; but that is immaterial, if we take it from the ſurface of the water.

I wiſh to know the reaſon of that veſſel coming through the Swillys, and over Carnarvon Bar, in preference to keeping the ſea, and going along Holyhead?——In conſequence of the wind coming to blow a gale from the Northward, ſhe could not weather Lynus Point; the Captain being an Engliſhman, he knew the Straits of Menai, and bore up to make his paſſage through theſe Straits, and conſequently made his paſſage through St. George's Channel into the Weſtern Ocean.

Then I am to underſtand that the wind which was adverſe from his getting round the Iſland of Angleſey, was fair for him to make his paſſage through the Straits of Menai?—It was perfectly a leading wind through the Straits and over Carnarvon Bar.

Do veſſels from Liverpool frequently avail themſelves of that paſſage?——They do in general; moſt unqueſtionably they do.

Do you mean that ſhips of burthen would prefer the Straits, to going round the Iſland?——No, I do not.

What was the greateſt burthen of any veſſel you have known paſs the Straits?——The largeſt that ever I ſaw when I was a youngſter, was between 400 and 500 tons, as I believe they ſaid, to the beſt of my recollection.

Capt. J. Jones.

Would the proposed bridge prevent coaſting sloops beating through the Swilleys to windward?——Yes.

Have you any reason that you can give why it ſhould prevent them doing so?——Yes, I have reasons.

State those reasons?——In the nature of turning to windward, the prevalency of the South-weſt winds renders this passage of more consequence to be free from any obſtruction, by vessels having altogether to turn to windward. As a seafaring man, and knowing something respecting this navigation, I do not nor would I pretend to turn a vessel through; and my reasons for so saying are, that it is impossible for any scientific man whatever, to calculate how and in what manner he can get under the centre of that bridge; for a sloop in ſtays will sometimes ſhoot ahead from thirty to forty yards, and we cannot calculate what pivot to turn upon.

And then you think if a vessel ſhould miss the center of the arch, it might endanger the carrying her maſt away; am I to underſtand that to be your opinion?——Moſt undoubtedly, if the maſt be higher than the height of the arch.

Do a number of vessels often turn through to windward at the same time?——Yes.

Would this Bridge make it more inconvenient to a number of vessels than to a single vessel?——Moſt materially.

At what rate do you suppose the tide to run, when vessels attempt the passage?——It depends chiefly upon the time of tide: it runs, after it turns, three or four knots, and then increases regularly from eight to nine knots.

Are you correct as to the rise of tide at high spring tides to the height of thirty feet?——Yes, it does rise to that height at the Equinoxes.

Upon the whole are you of opinion, that the proposed bridge at *Ynys-y-Moch* would be injurious to the navigation of the Strait?——Moſt decidedly so.

Has there been any meeting of seamen at Carnarvon, to take this bridge into consideration?——Yes, the whole of the sea-faring men at Carnarvon, the maſters of the ſhips belonging to the Port, and the pilots of Menai, have met.

What was the opinion of the seamen and pilots?——They were decisively againſt it.

Has any communication been made from Anglesey to Liverpool; has any remonſtrance been made as to the difficulties that would occur as to the passage?——There were letters written to the head of the Corporation.

You said that an Armenian vessel of 300 tons made up the Menai; did you ever know one of 300 tons pass up before?——Yes I did; I have known them frequently.

In the course of how many years?——Perhaps more than twenty or twenty-five years.

It is an accidental thing when they do go up that way?——No, they do not go up accidentally; it is a matter of choice; it is either from choice or necessity.

What is the usual size of vessels that pass that way?——From the loweſt regiſter, according to Act of Parliament, 15 tons; to the higheſt, say 350 tons.

You have known a vessel of 350 tons go through?——I have known one of 400 tons go through.

What is the common run of vessels that pass that Strait?——They are from 200 tons downwards.

Do you not think that vessels of 200 tons will pass with great ease, or without danger to themselves?——No, they cannot pass with ease.

Are there many vessels of 200 tons pass in a year?——A great number.

What do you mean by a great number?——I mean a plurality, of course.

How many?——I have not certainly made up my mind upon the subject.

Do you suppose 10?——I would not particularize any number, as I cannot.

Do you suppose five?——The returns will ſhow you.

Do you suppose five when you say many?——Whatever I may say, I do not wiſh to disprove the returns.

What do you mean to attach to the word many?——I mean more than one of course, but the returns will ſhow you.

What is the usual height of the maſt of a vessel of 200 tons?——It is about 128 feet above the surface of the water; perhaps some are more, and some are less.

I thought

Capt. J. Jones.

I thought you said that a vessel of 300 tons was 130 feet in her maſt?——Yes.

You have ſtated that the vessel of 300 tons which passed through the Straits, was from 130 to 140 feet in her maſt?——Yes, I have ſtated so.

And that a vessel of 200 tons, was in her maſt about 128 feet?——Yes.

Is the usual difference between ſhips of that burthen, in the length of their maſt, about six or eight feet?——Not much more.

Do you know what the height of a vessel of 300 tons, with her top gallant maſt ſtruck, would be?——It will reduce the height about 32 feet.

I want to know if you saw the plan that was proposed laſt year?——Yes, I did.

Do you think that the present plan would be as injurious to the navigation as that proposed laſt year?——No.

Upon what do you found that opinion?——Because it is intended to be certainly in some measure less objectionable, but in a very small degree.

In what point is it less objectionable?——Because, had the bridge been erected at the Swilley rocks, you might as well have ſhut up the place, or ſhut up ſhop at once; and this is very little better.

Do you know what the average rise of the tides, at the common spring tides, at *Menai* usually is?——From 24 to 27 feet.

Has there been any communication between the ſhip-owners at Carnarvon and the merchants at Liverpool upon the subject of this bridge?——I really cannot tell you respecting this bridge; I rather think that our Secretary has written to the merchants, who were always ſtrenuous in the cause againſt the measure of a bridge across the *Menai*.

Do you know of any reply from the merchants of Liverpool?——No, I do not, and I do not know if there were any thing written.

Do you think that the average number of vessels that pass this Strait are under 100 tons?——I suppose they are considerably under 100 tons.

Have you heard that in three years, 1807, 1808 and 1809, but seven vessels above 150 tons passed these Straits?——No, I have not heard it, but I have seen the returns before.

Do you believe them to be true?——Yes, I do.

Do all the square-rigged vessels that trade to and from Carnarvon?——In some cases, invariably.

And they always set their royals in coming over *Carnarvon Bar*?——Yes, but it depends upon the winds; perhaps they have no necessity for so doing.

In turning to windward over Carnarvon Bar, do they ever set the royals?——I have often set my royals, and every one, in case of light breezes, will set them, if the wind admit of it.

What size may the vessel you command be of, what is her tonnage?——I have commanded vessels from 30 tons to 250 tons.

Supposing the vessel you commanded were of 250 tons, and you are laying at Bangor, would it ever enter into your imagination to go through the *Swilleys* with a wind at South-west?——No, it would not.

Did you ever turn a square-rigged vessel through the Swilleys, the wind dead on?——No, I have not turned them, but I have seen square-rigged vessels turned through.

You have said vessels; did you ever see more than one brig?——Yes, I have, and particularly the *British Queen*, Robert Jones; and I recollect seeing another; these were the only two I ever saw.

Did you ever hear of any other?——Yes, I have heard of others.

Would you without any difficulty, if laying at Bangor, turn a square-rigged vessel through the Swilleys, the wind dead on?——What vessel do you mean?

It does not signify as to the size, say 150 tons; as the present navigation stands, would you think you did your duty to your owners by attempting it?——No, I certainly would not attempt it; it is dangerous enough as it already stands.

Are there not two modes usually in practice of carrying a square-rigged vessel through the Swilley navigation?——I have seen one mode, and that is by gauging a vessel.

How many modes are there in passing the Swilleys?——There are four modes;

Capt. J. Jones.

the first is turning through, the second is gauging through, the third is backing and filling occasionally, and the fourth by having a leading or fair wind.

With a brig of 150 tons, would not you prefer and wait for a leading wind to pass the Swilly, in preference to the other modes?——Most undoubtedly.

In carrying a vessel through the Swilly loaded, do not you invariably have a boat a-head or alongside ready?——Not invariably; but in case of a light or baffling wind we always have a boat ready.

Previous to the entrance of the Swilly, do you not invariably, with a large vessel, keep the very centre of the ſtream?——No.

Supposing the tide with you?——No, not even admitting the tide with me.

State your reasons?——My reasons are, that with a wind at North, it is necessary for me to borrow upon *Ynys-y-Moch* as close as possible, and the tide setting rapidly upon the Platters, which are near in the same direction, it requires that the vessels ſhould keep to the windward as much as possible, in order to avoid those rocks.

The wind being at North, as near as you can imagine it to be, could you with a square-rigged vessel so far depend upon that wind at North, that you would have no fear of its baffling over the land, and heading you?——As it remains at present, I could depend upon it better than if there was a bridge built; but there is no certainty of winds in the Swilly, and we depend upon the winds entirely, and upon the time of tide.

In the case of a freſh Northerly wind, would you venture a brig of 150 tons through, without hesitation?——Yes; a vessel of 500 tons, without the bridge.

And yet you say, you can never depend upon the wind at all in the Swilley, that it does baffle?——I certainly do say, that it does baffle there very often, and oftener than we wiſh; but we cannot even depend upon the Ocean, let alone the Swilly.

Is it not peculiarly baffling in the Swilly?——It is baffling of course, but not peculiarly so. I know one navigation, the entrance into Dartmouth, where it was more baffling.

And yet you undertake to say, that without hesitation, you would take a veſſel through the Swilly, of 500 tons, with a wind at North, blowing freſh?——Yes.

In consequence of your saying that you muſt hug the Anglesey ſhore, do you not mean, and ſhew by that, that the North wind is a scant wind to pass the Swillys?——I consequently muſt admit that it is a leading wind, but not a scant wind.

You have said, that a North wind is a leading wind?——Yes, I do.

Then I apprehend, if it be a leading wind, it will be juſt as well to take the centre of the passage?——By no means.

State your reasons?——It is for the reasons I have ſtated before. It is because there is a ſtrong tide setting from *Ynys-y-Moch* right upon the Platters, and my reason is, to avoid getting upon those rocks.

You said, that the navigation of the river would be injured by the bridge proposed to be built?——Yes.

And you said, it would be injured by creating eddies in the water as well as in the winds?——Yes.

How does the bridge affect the water?——By causing a corresponding counter current in proportion to what is embraced in the water.

How far are the abutments of this bridge to be built under the water?——About 100 feet, more or less, I do not know exactly, to high-water mark.

What proportion does that bear to the whole section of the river?——It bears, upon both sides, not one-fourth.

What is the depth of water there, compared with the center of the river; the average center of the river?——The soundings are very irregular there; they are 4, 5, 6, 7, or 3 or 4 fathoms, owing to the broken and rocky bottom.

Is the water there nearly equal to the average depth of the river, close to the ſhore I mean?——It is a bold ſhore upon each side.

And what is the breadth of the river at that place?——It seems, by the Plan, to be 500 feet from one abutment to the other.

Did you mean to say that these abutments would be exposed to one-sixth part of the whole water of the ſtream at that particular place?——More than one-sixth according to this Plan.

Then you conceive that the alteration proposed in the current of the river, will

be

Capt. J. Jones.

be by the abutment meeting one-sixth part of the water in its passage?——There certainly will be a moſt material one of course.

You said it would also create a great change in the winds?——Yes, I did; they are very baffling and deſtructive in this inſtance.

How do you mean deſtructive; do you mean that it would be utterly impossible to come through the bridge?——Yes, I do say that it is not possible for any man in his sober senses, with a vessel of 50 tons, to turn through to windward.

Do you conceive, that turning through that bridge, or the ſtrait where the bridge passes, would be as difficult as it is at present to turn through the Swilley?——There is no comparison; now it is practicable, but then it would be impracticable.

Do you conceive that the alteration of the wind will be entirely in proportion to the solid surface presented by the bridge to them?——Yes, I do.

Then the iron bridge presenting a much smaller surface than any other bridge, the variation of course will be infinitely less than any other bridge?——Of course, with an iron bridge, the variation would be much less than a wooden or ſtone bridge, and that variation principally arises from the immensity of the abutments.

You said that it would be impossible to turn a vessel through the bridge?——Yes.

A vessel of a particular size you meant?——A vessel of 50 tons.

Have you had any experience of navigation under bridges?——The experience that I have had is this; that it is from the conviction I have had, by sailing under bridges even in boats; I never was under a bridge in a ſhip; and that it is a natural cause, that the wind strikes exactly through the bridge. Although I never was in a ſhip under a bridge, yet I know the consequence that would result from it.

And those bridges, with which you have been conversant, were all ſtone bridges?——They were ſtone bridges.

And may I ask where, principally?——I have passed under ſtone bridges and wooden bridges in different parts of the world; they would be too tedious to enumerate.

Have you any particular inſtances?——Indeed I have had many in turning my boat through bridges.

Have you had this experience in one bridge more than the other?——I have not navigated one more than the other, but I have gone under bridges in different parts of the world.

And you guess at the effect of it?—Of course, I drew the conclusion that I could not even use my sails under an arch in my boat.

Suppose you are passing under this bridge with a leading wind, would any inconvenience result from your ſtriking your top-gallant maſt?—Yes.

What?—The consequence of a light airy wind would be, that I would lose my ſteerage-way, and my vessel become ungovernable in so dangerous a place.

Do you not know nor believe, that large and unwieldy vessels with flat bottoms, turn through under Weſtminſter Bridge, the tide being favourable, although the wind ſhould be unfavourable?—I have seen craft of 40 or 50 tons going through with their maſts ſtruck; but there is no comparison between Weſtminſter Bridge and the Swilley.

Is not the tide there as rapid as it is here?—Yes, more so.

And would not that facilitate the passage of the vessels through there, more than here?—No, it would not; they are as unmanageable as a log of wood.

Mr. LEWIS OWEN, called in; and Examined.

Mr. Owen.

You are acquainted with the navigation of the Swilleys?—Yes, Sir, very well.

Have you lately come through the Swilleys?—Yes, I have, in the month of April laſt.

Was there any danger of your losing your vessel as you came through?—Yes, I was in very great danger.

From what cause was you in that danger?—From varying winds and eddy tides.

What happened to you?—We were ſtanding down along, and the wind baffled us northerly, and then came to the weſtward upon us, and the wind took us aback, and the got into the eddy tide, and got plump upon ſhore, and afterwards we filled her upon the other tack, and the vessel dragging away, the back

Mr. Owen.

of the rudder was torn to pieces, and afterwards we had nothing to do but only trim her with her sails as well as we could, and then we got clear with great difficulty.

Have you ever seen any plan of the proposed Bridge at the Swillys?—I have not seen it, but I have heard of it.

In your opinion, would any bridge in any part of the Swilleys be injurious, or not, to the navigation?——Certainly it would be injurious, becauſe it would cauſe more eddy tides and eddy winds.

Is a north wind a leading wind or a ſcant wind to go through the Swillys weſterly?——A vessel can juſt sail through it, and no more, if it is a scant wind.

She can lay her course with it?——It is a scant wind, but ſhe can lay her course with it.

Should you hesitate to take a vessel through the Swilleys with a north wind?——Not to take her down to the southward in case there was a good ſtiff breeze of wind.

Admiral BENTINCK, called in; and Examined.

Adm. Bentinck.

You are an Admiral in His Majeſty's service?——I am.

Do you know of any plan of building a bridge across the Menai?——I have heard of such a proposal.

Do you know the spot?——I do know it, and I have been all over it.

Have you seen the Plan, and can you of your own knowledge ſtate that any injury would arise to the navigation from its being carried into effect, adverting to the nature and size of the vessels?——In my opinion, none.

I beg to ask you, if you have observed vessels sailing to and fro in those Straits?——Very frequently; and I have gone through in vessels myself.

I wiſh also to ask you, if you have at that time, or at any time since, considered the navigation in a professional view?——Of course I always muſt when I am upon the water; the firſt thing that ſtrikes me muſt be in a professional point of view; in spite of oneself, it so ſtrikes sailors.

I wiſh to ask you, if looking at the larger class of vessels that appear to have passed through the Swillys within a certain period, it be not your opinion that in every case, with the exception of that of a leading wind, it would be better to make the circuit of the Island, rather than encounter the risks of the Swillys?——That would depend upon the time of the year; in the summer-time I would rather make the circuit of the Island than go through the Swilly, but in the winter-time I would rather wait for a leading wind than go round the Island, supposing it impossible to go through without a leading wind, which I do not suppose.

Is it your opinion that the maſter of a brig can ever attempt to pass the Swilly, the wind being right on end, without an unjuſtifiable risk to his owners?——I cannot give a positive answer to this, not knowing how many ſhips have gone through with the wind right on end; I do not think the erection of the bridge would make the smalleſt difference in the queſtion, for if it is not the practice to go through with the wind right on end while there is no bridge, and that the bridge makes no difference, of course my opinion muſt be, that the bridge would not be an impediment to the navigation of the Swillys.

I would wiſh to ask you, whether you are very conversant with the navigation of the Swillys: I put the queſtion to you as a professional man, whether you be very conversant in the navigation of the Swillys?——As a professional man, I am not very conversant with the navigation of the Swillys, but any professional man having been through the Swillys two or three times, is as good a judge of the effect which a bridge would have upon the navigation of the Swillys, as if he had been through five thousand times.

Do you know the rapidity of the current of the tide?——I have seen the current running at the rate of from two knots to four or five knots.

And does Admiral Bentinck suppose that is the extreme rapidity of the tide?——I cannot answer that queſtion; but if it were a ſtronger tide, I fancy no vessel would attempt to beat through; because it must be accompanied by so much wind as would endanger the vessel passing.

Do you know the height of that arch, as projected by Mr. Telford?——I underſtand it to be 100 feet above the level of high water, and 120 feet above the level of low water.

Supposing

Adm. Bentinck.

Supposing it to be 100 feet above high water, do you think that a sufficient height for a vessel of 300 or 400 tons to pass, allowing maſts ſtanding?——With all her maſts ſtanding, perhaps not; but with her top-gallant maſt ſtruck, certainly.

Do you, as a professional man, not think that in light airs a vessel might want all her sails to carry her through the rocky and dangerous Strait, where it is absolutely neceſſary that ſhe ſhould keep the true tide to avoid the eddies of that Strait?——With a fair wind, certainly.

Do you know that vessels do not frequently turn to windward every day with the ebb tide?——I have seen them do so.

Do you think that at the entrance of that dangerous pass, the projected bridge with abutments coming far into the river, to the extent of 130 feet in all, would not make it more difficult, not to say dangerous, for vessels so to turn to windward?——Not at all; for I consider the pass which you allude to, to be the leaſt dangerous spot in the Swillys, because the channel is confined between rocks; with respect to the abutments, I do not consider that they project into the River, because no vessel could come upon any part of the spot to be covered by the abutments.

I wiſh to know whether vessels, although they do not go exactly upon that spot where the abutments come into the river, whether the eddy tide occasioned by those abutments, may not make the passage more difficult and dangerous?——I conceive not, because the passage between the abutments will be the narroweſt part of the passage through the Swillys, and in the narrowest part of any passage or current, there is never any eddy tide.

I wiſh to ask you whether in vessels turning to windward, a sloop of 80 tons burthen would always be enabled, in tacking, to take the centre of this projected arch?——I conceive that a vessel may take any part of the arch ſhe pleases; but I see no reason why ſhe ſhould take the centre.

I ask you then, whether, if ſhe be not enabled to take the centre of the arch, but is driven considerably nearer to the abutments, there will then be height enough for maſts to pass under that arch, reduced to 40 feet at the extremities of the arch?——I conceive that no vessel that could be driven to the necessity of going near to the abutments againſt her will, would attempt to beat through, and that every vessel that does beat through, is under such command as will enable the person commanding her to go through any part of the bridge he pleases.

Are you perfectly well acquainted with the spot where this bridge is to be thrown over?——Not at all.

Have you taken particular notice upon that part more than upon any other?——Not at all; I have seen it, I went through with Mr. Telford, and have gone through at other times, and I apprehend that the queſtion of the bridge is of no consequence as to the navigation of the river.

You were upon the spot with Mr. Telford when he made his Survey?——I was; and when I went down, Admiral Aylmer was with me, and also examined it, and before I reached the spot, my opinion from the report of others, was decidedly againſt the practicability of the bridge; but upon seeing the spot, I was perfectly satisfied with Mr. Telford, that the thing was practicable and would be highly useful.

Do you think that there is no necessity for vessels hugging to the rock *Ynys-y-Moch* upon particular occasions?——Certainly there is, and that depends upon the set of the tide, which depends, more or less, upon the set of the wind.

I wiſh to know what was the impression upon Admiral Bentinck's mind before he went down, as to the effect the bridge would have as to the navigation?——I never had the leaſt doubt as to the advantage of the bridge to the Public, nor had any difficulty in my mind in declaring, that it would not affect the navigation of the Swillys.

Mr. TELFORD again called in; and Examined.

Mr. Telford.

By the new line of Road you have proposed through Anglesey, are not the principal inns and towns in the present line totally evaded, and thereby local intereſts

Mr. Telford. intereſts materially injured? With the exception of Holyhead and Bangor, you have ſtated in your former evidence, that your inſtructions were to point out the moſt direct communications through Angleſey, without regard to inns, towns or private intereſts; is it your opinion, that as good a Road, or nearly as good a Road as that which you have pointed out, can be formed through that country without a ſacrifice of its local intereſts?——If by thoſe local intereſts, *Langefni* and *Gwyndû* are meant, I conceive that by a variation of the line which I have now laid down, adding about two miles to its length, a line of Road otherwiſe unobjectionable, might be obtained.

Does the line propoſed to include thoſe inns and towns preſent a greater degree of level than your line, ſo that what was loſt in diſtance might be made up in time?——That I cannot anſwer, not having taken any ſurvey or levels.

Lunæ, 20° *die Maii,* 1811.

Right Honourable JOHN MAXWELL BARRY, in the Chair.

John Thomas, Examined.

John Thomas. ARE you a pilot in the River Menai?——I am.

Are you well acquainted with the Swilleys?——I am, or I ought to be.

How many years have you piloted veſſels through the Swilleys?——Twenty years.

Is the navigation a difficult and a dangerous one?——Yes.

Have you ever met with accidents in taking veſſels through yourſelf?——Yes.

Have you had theſe accidents happen by ſudden calms and by baffling winds?——Yes.

Have you ſeen a Plan of the Bridge propoſed to be built at Ynys-y-moch?——Yes, I have, down at Carnarvon.

Have you looked at that Plan on a larger ſcale?—[Shewing the Witneſs a Plan upon a table.]——Yes, I have.

Is this like the Plan which you ſaw?——I think it is, but it is larger.

How high does the tide riſe at an high ſpring?——Thirty feet and upwards, at the Equinox.

At what rate does the tide run at theſe high ſpring tides?——From eight to nine knots.

You ſay, that at high ſpring, the tide riſes 30 feet and upwards?——Yes.

Now, if the centre of the arch of a bridge ſhall be 92 feet high, would you undertake to pilot a large brig there with the faireſt wind that you could have?——No, I could not.

What is the faireſt wind to bring a veſſel through?——From N.E. to E.N.E.

What is the line of the direction of the Swilleys from Bangor Ferry to Llanwer?——Eaſt and Weſt in the centre.

Are the backs of the Straits high on each ſhore?——They are, and they cauſe baffling winds in the Swilleys.

What ſails, in general, are of moſt uſe to you in piloting a ſquare-rigged veſſel through the Straits?——The higheſt ſail I can ſet upon the ſhip.

Then you mean that a high ſail is the moſt uſeful to you?——Yes, top-gallant ſails, royals and top-gallant ſails; top-gallant ſtudding ſails, if I could carry them.

Do you not think that if you were to lower theſe ſails it might endanger your veſſel?——Yes.

Then I ſhould wiſh to aſk you, whether with the faireſt wind you can poſſibly have in the centre of the archway of a bridge at Ynys-y-moch, being 92 feet high, it would be high enough for the top-gallant maſt of a large brig, ſay of 200 tons, to paſs under it?——No.

Do veſſels of a larger burthen than 200 tons paſs the Straits?——Yes.

What was the largeſt veſſel you ever piloted through the Swilleys?—From 6 to 700 tons, I have heard.

You

John Thomas.

You do not know accurately the size yourself, but you say you were told so: by whom were you told ſo?——I was told so by a Captain, that it was from 6 to 700 tons; the Captain of the Jupiter to Boſton, and by the Captain of the Stevens of Liverpool, Captain Burke.

Can you recollect at what time it was you piloted these vessels?——About seven years back it was.

Which was the firſt of them?——The Stevens.

And when was the Jupiter?——They were within a few years of one another.

Q. If the arch of a bridge were to be 150 feet high, do you think that a bridge built at Ynys-y-Moch would add to the danger of the navigation?——I am certain of it, that it will.

After a vessel has passed Ynys-y-Moch rock, I wiſh to know whether there is any possibility of letting down an anchor in the Swilleys, ſhould an accident happen to your veſſel?——No, except you let go your cable and anchor, and you never get them again.

Does a square-rigged vessel of 100 tons return through the Straits with the same wind?——Yes; I have with many myself.

Do coaſting vessels from 30 to 60 tons often beat through?——Yes, and upwards; sloops of 100 tons go through.

How many have you ever seen beating through at the same time?——From 15 to 20 together.

Do you think you could run a sloop through of 50 tons, if the centre of the arch was 92 feet high, and reduced to 32 at each end of it, at Carnarvon ſhore from the rock?——No, nor any pilot in the River.

Why could not you run a vessel through?——Because I ſhould lose my wind by the high hills on the Anglesea side.

But how would the bridge add to the height of the hills; why ſhould you lose your wind the more by the bridge?——Because it would add to the banks.

Are you then of opinion, that if a bridge ſhould be built according to the Plan which you have seen, that it would materially injure the navigation of the Swilleys?——It would.

What is the rise of the common spring tide?——From 24 to 26 feet; it is sometime less than 24 in the summer-time.

You have said that the Equinoctial tides rise 30 feet?——Yes.

What means have you taken to ascertain that with accuracy?——I do not underſtand you now.

How do you know that the tide rises to 30 feet, as you have said it does?——I am certain of it.

But how are you certain of it?——Because it was told me.

Did you try it yourself?——No, I did not.

Then how can you be certain of the height?——I am sure of it; I will ſtand to it before this Committee; I will take my oath of it.

Did you examine the plan of the bridge with care and attention, where it is proposed to be, at Carnarvon?——Yes; and many other plans, and at Bangor.

But did you examine *this* plan of the bridge with care and attention?——Yes, I did; I know the height of it very well.

What is the height there calculated?——Ninety-two feet.

Upon the plan?——I cannot tell.

You are sure you examined the plan?——I am.

Do you say it is 92 feet?——Yes; 92 feet, I have heard.

Did you observe such a thing as a scale in that plan of the bridge?——I do not know any thing about scales; I am no scholar.

John Thomas.

Do you know how many feet the abutments project from high-water mark in these Straits?——

Do you know what abutment is?——Yes.

Then how far do the abutments ſhoot into the water?——I do not know.

You have not then examined the plan according to the scale?——Yes; I know something about it; I know very well when it comes to the water-side.

I want to know whether you are acquainted with it by the scale upon the plan?——No; I do not know any thing at all about the scale.

Have you ever had any opportunity of ascertaining, or of knowing the effects of the arch of a bridge upon the current of the air?——I do not underſtand that queſtion.

Upon the wind; do you underſtand that; the effect which the arch would have upon the wind?——Yes; I do underſtand that a little.

Did you ever sail under a bridge?——No.

Was you ever under a bridge in a boat?——Yes, I was under London Bridge.

Then did you, or did you not observe, that there was a considerable ruſh of air through that arch?——Yes, it does; but how far it would reach, I do not know.

How do you measure the rate of the tide, so as to ascertain that it runs eight knots an hour?——We took it with a King's boat.

You say *we* took it; *who* took it?——We took it; there was a company in a boat; four or five of us.

What were your means of ascertaining the fact; how did you do it?——By bringing the boat to an anchor, and I was myself at the helm; Captain Griffiths had the log.

Captain William Griffiths, who was examined here?——Yes.

Cannot you always place your vessel in the centre of the Straits between Ynys-y-moch and Carnarvon shore, either by a boat a-head, or, if there is wind, by so calculating your previous tacks, as you do in the passage between the Swilley rocks?——Yes, I can.

You can?——Yes, if I had the command of her.

Do you mean to say it would always be in your power to take the middle of the river in running to windward with a sloop?——No, it will not do.

What is your wiſh for running yourself so near Caernarvon shore in running to windward?——Here is my vessel, [pointing at the place upon the Plan.] I always wiſh to come as near to Caernarvon Shore as I can in tacking.

Would it not endanger the loss of your vessel, with some winds, if you were not able to put your vessel about near Caernarvon ſhore?——Yes, it would; for the sake [because] I muſt heave my vessel on the inside of the Platters; and another reason is, if I go out in a calm, when on the outside of the Platters, I am in danger of being drove on the Swilley Rocks.

[Cross-Examined.]

Do you think that a bridge of any kind, be it ever so high, or ever so wide in its arch, could be erected over these Straits, without injury to the navigation?——It would injure it to the higheſt degree.

Would a bridge, of any sort or description, injure the navigation there?——Yes, it would, in the higheſt degree; there is no Pilot can take charge of a vessel in safety, if a bridge be built on any part of the Swilley Rocks.

Do you consider Ynys-y-moch as part of the Swilley Rock?——It is one and the same thing.

One and the same thing?——Yes.

Will you ſtate to the Committee the reasons why you are of opinion, that a bridge at this place would injure the navigation; what is the cause of your thinking so?——Because it will add more to the eddy winds than there is at present.

Have

John Thomas.

Have you ever been under any bridge but London Bridge?——No.

Then how can you take upon you to say, that a light iron bridge, that the proposed bridge rather, would add to the eddy winds?——I know it, by what is there already of trees and high lands, and a bridge of any kind muſt add to it, which is bad enough already there.

Do you think the effect would be the same, of a vessel going under this iron bridge, as that of going under a common ſtone bridge, such as London Bridge?——If there was a *ſtone* bridge, it would smother the swells entirely; and another thing is, that if an iron bridge was there, no vessel would attempt to go near it, because they are frightful enough already.

You mean the *Rocks* are frightful enough already?——Yes.

Am I to underſtand you, that you would not undertake to pilot a vessel of 100 tons burthen, with a leading wind, through the Swilleys, if a bridge were there; that is, if the proposed bridge were there?——No, I would not; I could not, in safety, nor any other man.

Would you one of 50 tons?——No.

Would you go in a row-boat under it?——Yes.

Would you, with a leading wind; mind, I ask you with a leading wind?——Yes.

Why would you not, with a leading wind, *sail* under that bridge?——There is so much danger after I go under the bridge, or for 100 yards or more.

Is it not very common for you to take a vessel with a boat a-head?——Sometimes we do, but small vessels.

You never had a boat a-head to a vessel of 100 tons?——Yes, I have, to protect the sailing, and to help us in.

Do you think that, with a boat a-head, there could be any possible difficulty in taking a vessel under the arch of the proposed bridge, and that in calm weather there is any difficulty in taking a vessel under that proposed bridge with a boat a-head?——No, there would be no difficulty if I can have the centre of it.

OWEN WILLIAMS, Esq. (a Member) Examined.

O. Williams, Esq.

Are you acquainted, with the navigation of the Strait of the Menai?——I have been in the habit, for the laſt 15 years, of going through the Swilleys three or four times a week at leaſt during the Summer season.

In what description of vessels?——In vessels of about 35 tons.

From the observations which you have made, and from your acquaintance with these Straits, can you form an opinion whether this proposed bridge would, or would not, be injurious to the navigation?—It might occasion, in some respects, slight inconveniences, but no positive danger that I am aware of.

Can you state what these slight inconveniences would be?——Possibly a little delay, in order to gain the centre of the river, in the cases of very tall vessels.

Can you ſtate any other inconveniences which are likely to arise?——I am not aware of any.

Then you do not think that the safety of vessels navigating these Straits, would be endangered by the erection of a bridge at this place?—Certainly not.

Do you know the rate at which the tide runs through these Straits?—I have never heard it accurately ascertained.

Do you know the rise of the tide at the common spring tide, at this place?—I do not know it positively; but it is generally looked upon as about 22 feet at the higheſt spring tide. I am not, however, speaking of the tide at the Equinox, for of that I have no positive and specific knowledge. I speak of any tides but those at the Equinox. I am not very sure it rises much higher than I have ſtated, at the Equinox; this I say from what I have heard, for I cannot speak upon that point from my own knowledge.

Mercurii, 22 die Maii, 1811.

Right honourable JOHN MAXWELL BARRY, in the Chair.

Mr. *Jones*, called in; and Examined.

Mr. Jones.

HAVE you made any plan and eſtimate to cut away any rocks in the navigation of the Menai?——Yes.

Have you got it?——Yes, I have.

Be so good as to deliver it in: What does it amount to?——£.5,633. 5. 0. The rocks called Cribbinniau.

Are those sunken rocks?——Yes, they are, and when it is two hours flood.

Do they tend considerably to endanger the navigation of the Menai?——They do.

Your eſtimate is £.5,000 for blaſting those Cribbinniau?——Yes, it might be done for less, if there was any public work to take the people that will be employed there, for they cannot work now 2½ hours or 3 hours in a tide.

How far is the proposed situation of the bridge from the proposed works?——A mile or thereabouts, I suppose.

Is it a mile?——By land it is a mile. From three quarters, to a mile, or somewhere thereabouts.

Do you not think the Swilly Rocks much more than the Cribbinniau?——The Cribbinniau is the more. It prevents the water running free down to the Swilly. The rocks in queſtion, the Cribbinniau, are under water.

Do you conceive it would be a moſt material improvement to the navigation?——In my opinion it would be a very great improvement, and not only my own, but I have heard several say so besides.

Experienced persons?——Yes, Captains and Pilots, and those people concerned in and acquainted with the place, that is the general account that they have given.

Are you a seaman?——No.

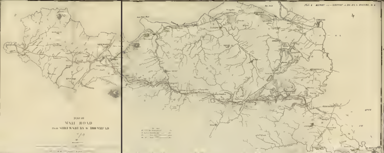
You are no seaman; then the opinion you have given, is what you heard from others, not your own?——Yes, from others, as well as having seen the place myself, the rocks and the Swilly, several times.

Were you not employed to blaſt the half-tide and quarter-tide rocks?——I was; they are marked in the plan (F) and (G).

You were employed; did you complete what you undertook to do; did you get them down to the height?——We got them down to the low-water mark. There was a piece of iron put down on the Carnarvon ſhore, and we got them down to that level. They are above low-water, at extraordinary spring tides now, two feet.

Did you get them down to that mark you undertook to do?——Yes.

Appendix,



MAP OF
MAIL ROAD
from SHREWSBURY to HOLYHEAD

Appendix, No. 2.

Mr. TELFORD's REPORT to the Right Honourable the Lords Commissioners of His Majesty's Treasury, respecting the *Great Roads*, from *Holyhead* through *North Wales*.

Mr. Telford's
Report to
Lords of Treasury,
22 April 1811.

IN obedience to Your Lordships Instructions, dated the 4th May 1810, no time was lost in commencing surveys in North Wales. The project being extensive, it was necessary to precede the actual detailed surveys by careful perambulation, and various trial surveys. The most important points in general Lines of Communication through mountainous countries appear to be, 1st. The direction and shape of the Vallies. 2dly. The comparative elevations of the Passes in the Ridges which separate these Vallies. And 3dly. The crossing large Rivers, particularly, in this case, the arm of the sea which divides Anglesea from Caernarfon, and also the tide way of the Conway River.

Having (with these general points in view) examined and attentively considered the various lines proposed, or of which the country is susceptible, between Holyhead and Shrewſbury, and also between Bangor Ferry and Chester, and having determined the principal points which were to regulate the surveys, I, in order as much as possible to guard against prejudices respecting particular lines, employed persons unknown in Wales, and accustomed to make Road surveys in similar countries in Scotland; with the same view I avoided communicating with Land Owners or others interested in the track through which the surveys were carried, considering in general surveys of this nature, that it is better to judge from the shape and distribution of the country alone.

In order that a correct judgment may be formed of the state of the present Roads, I have caused accurate surveys and sections to be made and laid down on the same Maps, and to the same scales with the new lines; this will shew their comparative distances and ratio of inclination.

Having laid down the lines of Road from the actual surveys, the adjacent country has been filled up from the very excellent Map of Mr. Evans; this was necessary to shew the relative position of the principal Towns, Vallies, and country Roads.

HOLYHEAD to SHREWSBURY.

To preserve the order laid down in the Inſtructions, I shall proceed first with the line between Holyhead and Shrewsbury.

The general direction of this line is chiefly determined by the point of crossing the Menai, and circumstances connected with the valley of the Dee.

The Menai can certainly be crossed with most advantage in the vicinity of the present Ferry, and the valley of the Dee must be followed to near the great Aqueduct below Llangollen: this creates a very considerable bend to the N. E., but proceeding in a more direct line, is precluded by the unbroken ridge which forms the S. E. side of this valley. Much pains was in vain bestowed to obtain a line from near the Druid Inn, across the country towards Oswestry. But the pass at the Tannat summit is 1,100, another pass a little to the West of Corwen, at the Ceiriog summit is 1,246, and that leading to the Ceiriog at the Glynn is 996 feet all above the level of Corwen Bridge, and the lowest of them is about 500 feet above

Mr. Telford's Report to Lords of Treasury, 22 April 1811.

above the level of Kyrniogu. The Tannat valley, besides being entangled with this very elevated summit, is nearly as far to the S. W. as Llangollen is to the N. E. of a direct line; and the deep and confined valley of the Ceiriog, by creating two high summits, is an effectual bar to leaving the valley N. E. of Corwen, I therefore consider that the general line of communication muſt be continued in the same vallies through which the present Road passes.

But though continued in the same vallies, so ill conducted and imperfect is the present Road, that scarcely any part can be made use of. I have therefore, in chusing a new line, paid very little regard to it.

I shall now proceed in detail with the separate diſtricts; into which, for sake of diſtinctness, I have divided this line, beginning at Holyhead.

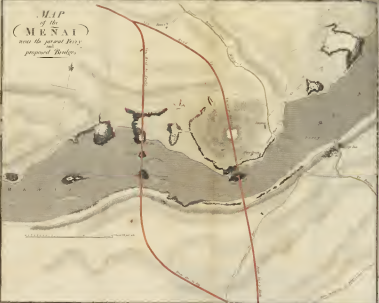
From HOLYHEAD to the MENAI.

From the Eagle Inn at Holyhead to the Weſtern ſhore of the Menai at Bangor Ferry, the diſtance by the present Road is 24 miles 810 yards. From the ſtreams in this Island running North and South, the Road crosses the vallies nearly at right angles, and frequently with rates of ascent and descent of 1 in 9½, 12, 15, 16, being inconveniently steep for Wheel Carriages; besides the greater vallies, the face of the country is almoſt wholly broken into small hills, over which the Road is carried in continual succession; it has also been carried nearly three miles to the North of a direct line, and bending towards the higheſt part of the Island. To attempt improving the present Road, so as to bring it to the ſtipulated breadth and rate of inclination, would amount to a total change, and muſt unavoidably lengthen it very considerably. To go more North, would be departing ſtill further from a direct line, and, unless carried several miles, would get upon ſtill higher ground. It is therefore to the southward, that the new one is chosen; this not only enables it to be carried more direct, but to pass the general summit at 160 feet lower level, by crossing Lady Stanley's Sands; the diſtance between Holyhead and the Menai is made 2 miles 1,556 yards less than by the present Road; and if even continued by the Four-mile Bridge, the saving in diſtance would ſtill be 1 mile 1,008 yards.

In the direction here propoſed a very excellent Road may be laid out, the greatest inclination not exceeding 1 in 30, and that adopted only in a very small proportion of the Road, in order to preserve a proper direction, and avoid unnecessarily increasing the length of the line, but the average inclinations are not 1 in 50.

The Estimates of the expense are formed upon the principle of having the Road 40 feet in width, of which 18 feet in the middle to be made with a bed of stones 15 inches in depth on an average, properly laid and broken, with the necessary Bridges, Cross Drains, Side Drains and Fencing, including the value of the land to be occupied by the Road, Side Drains and Fences, all executed in the most perfect manner. This sort of Road, besides the middle or winter Carriage Road, leaves a summer Road on each side, which, if proper regulations were adopted, would prevent inconveniency from Carriages meeting.

From Holyhead, to and across Lady Stanley's Sands, to the junction of line by Four-mile Bridge:	£.	£.
Road-making, including cutting and embanking - -	23,267	
Bridges and Drains - - - - - - -	340	
Breaſt and retaining walls, fencing land, and damages -	2,444	
		26,051
From D°, by Four-mile Bridge:		
Road-making, including cutting and embanking - -	7,355	
Bridges and Drains - - - - - - -	509	
Breaſt and retaining walls, fencing land, &c. - - -	3,908	
	11,833	
Carried forward - -	- £.	26,051


MAP
of the
MEÑAI
near the present Ferry
and
proposed Bridges
New Road
Road
New Road to Swillt
Ferry
To Bangor
M E N A I

Mr. Telford's Report to Lords of Treasury, 22 April 1811.

Brought forward - -	- £.	26,051
From junction of Lines to W. Side of Maldraeth Embankment:		
Road-making, including cutting and embanking - -	13,932	
Bridges and Drains - - - - - - -	417	
Breaſt and retaining walls, fencing land, &c. - - -	7,780	
		22,129
Across Maldraeth Valley:		
Road-making, embanking, &c. - - - - -	1,841	
Bridges and drains - - - - - - -	1,230	
Land, &c. - - - - - - - - -	600	
		3,671
From D° to Weſt Bank of Menai, opposite Swilly:		
Road-making, cutting and embanking - - - -	6,741	
Bridges and Drains - - - - - - -	602	
Breaſt and retaining walls, fencing land, &c. - - -	3,920	
		11,263
	£.	63,114
If carried by Four-mile Bridge - - - deduct	-	14,218
	£.	48,896

	Diſtance.		Expense.
	Miles.	Yards.	
From Holyhead to the Menai, across the Sand - -	21.	1,014	£.63,114
From - D° - to - D°, by Four-mile Bridge - -	22.	1,562	£.48,896
Add, if the Road is continued to Ynys-y-Moch - -			£. 4,509

The crossing the Menai having always been considered the chief obstacle in this important line of communication, I repeatedly examined it. I caused correct surveys and sections to be made, and perused the several Reports which have been made respecting it.

As a general explanation of the nature of the tides in the Menai, I shall insert an extract from a Report made in April 1783, by Mr. John Golborne, who seems to have very attentively considered the subject. " On April the second, being the
" day after new moon, the wind at S.W. and moderate weather, the tide flowed
" 19 feet 4 inches at the Swilly rocks, the current ran with great velocity towards
" Beaumaris for three hours and a half, when it changed its course, and ran
" towards Caernarfon; it continued flowing for an hour and a half, and then
" became ſtationary for half an hour at high water, but ſtill continued its course
" towards Caernarfon. During the ebb its velocity increased for an hour and a
" half, and then abated; at forty minutes after two there was very little cur-
" rent, and at three o'clock it again changed its course and ran towards Beaumaris
" with a ſtrong current, and continued falling till 20 minutes after five, when it
" again began to flow from Caernarfon. I ſhall endeavour to account for this
" irregularity in the tide's motion, which is very singular. It is to be considered
" that the tide coming out of the great Weſtern Ocean, makes high water, at the
" full and change of the moon, at nine o'clock on the Bar of Caernarfon, and at
" half-paſt ten at Beaumaris; the firſt of flood then arriving an hour and a half
" sooner at the Bar of Caernarfon than it does at Beaumaris, puſhes up the
" Streights of Menai with great violence, and meets the tide near Beaumaris
" which has flowed round the Island of Anglesea. It might indeed, have been
" expected to have arrived there sooner, as it had not one-fourth of the space to
" move over, and it moſt undoubtedly would have done so, was not its motion

Mr. Telford's Report to Lords of Treaſury, 22 April 1811.

“ greatly impeded by great obſtructions in paſſing over numerous ſand banks
“ and ſhoals lying between the Bar and Caernarfon, and in the mouth of the
“ Streights of the Menai. The Swilly Rocks too are no ſmall impediment, over
“ which it runs with great impetuoſity until the tide of ebb begins to make at
“ the Bar of Caernarfon; it ſuddenly changes its courſe, and runs the oppoſite
“ way with great violence, and the current becomes much increaſed by being
“ joined by the tide of flood flowing in at Beaumaris for an hour and a half,
“ cauſes a moſt violent ebb which runs with great violence through the Swilly.
“ At length the ebb at Beaumaris coming on, the other conſequently ſlackens,
“ and the current again changes its courſe near Lord Paget's houſe, and runs
“ for two hours towards Beaumaris before the flood comes again up the Swilly.
“ From the obſervations which I have made on the tides, it appears that they
“ flow five hours and ebb ſeven at the Swilly rocks, that very high tides have
“ riſen ſeven yards, and that the Swilly rocks are very dangerous to paſs for four
“ hours and a half in ſpring tides.” To theſe judicious remarks I ſhall only add, that from my own obſervations, and thoſe made by Mr. Morriſon, the Surveyor whom I employed, it appears that the ſpring tides, in July 1810, roſe 21 feet 6 inches, and that the greateſt velocity during thoſe tides, taken between Ynys-y-moch and the Swilly, was from 4 to 5½ miles per hour. The annexed Map and Sections will ſhew the relative ſituation of the ſhores, and the channel between them. The duty aſſigned me being to conſider and report reſpecting a *Bridge* across the Menai, I ſhall confine myſelf to this object. Admitting the importance of the communication to juſtify acting on a large ſcale, I not only conſider the conſtructing a Bridge practicable, but that two ſituations are remarkably favourable: it is ſcarcely neceſſary to obſerve, that one of theſe ſituations is at the Swilly rocks, and the other at Ynys-y-moch; theſe two being ſo evidently the beſt, the only queſtion that can ariſe is, to which of them the preference ought to be given.

From the Appendix to the Second Report of the Committee on the Holyhead Roads and Harbour, it appears that a conſiderable number of ſmall coaſting Veſſels, viz. from 16 to 100 tons, navigate the Menai, and there have been a few from 100 to 150 tons. By ſtatements from the principal Shipbuilders in the River, made in the year 1800, to the Committee for improving the Port of London, it alſo appears that Veſſels of 150 tons, when they have all an end, are only 88 feet in height above the water line; and further, that even Ships of 300 tons, with their top-gallant maſts ſtruck, are nearly the ſame height. Theſe in the Menai may be conſidered as extreme caſes, and if provided for, ought, as to navigation, to ſatisfy every reaſonable perſon; it may indeed rather be a queſtion, whether the height ſhould not be limited to Veſſels under 100 tons, by which the expenſe of a Bridge would be conſiderably diminiſhed.

In the Plans I have formed, proviſion is made for admitting Veſſels of 150 tons to paſs with all an end; that is, in one Deſign preſerving 90 feet, and in the other 100 feet between the line of high-water and the lower ſide or ſoffit of the arch. The firſt of the Deſigns is adapted for paſſing acroſs the three rocks, named the Swilly, Benlaſs, and Ynys-Well-Dog, which by their ſhape and poſition are ſingularly ſuitable: to embrace the ſituation moſt perfectly, I have divided the ſpace into three openings of 260 feet, and two of 100 feet each, making piers each thirty feet in thickneſs; over the three large openings, the arches are made of caſt iron; over the ſmaller ſpaces, in order to add weight and ſtability to the piers, ſemicircular arches of ſtones are introduced; but over theſe, as well as the large openings, the Spandrels, Roadway and Railing, are conſtructed of caſt iron. In this way the Navigation is not impeded, becauſe the piers ſtanding near to the outer edges, are guards for preventing Veſſels ſtriking upon the rocks, while the whole ſtructure preſents very little obſtruction to the wind. From the extremity of the abutments, after building rubble walls above the level of the tideway, I propoſe carrying Embankments, until the Roadway reaches the natural ground. The annexed Drawing will ſufficiently explain the nature of the deſign. I propoſe the Bridge to be 32 feet in breadth, and, from minute calculations made from detailed Drawings, I find the expenſe of erecting the whole in a perfect manner amounts to £. 158,698.

The other Deſign is for the narrower Streight, called Ynys-y-Moch; here the ſituation is particularly favourable for conſtructing a Bridge of one arch, and making

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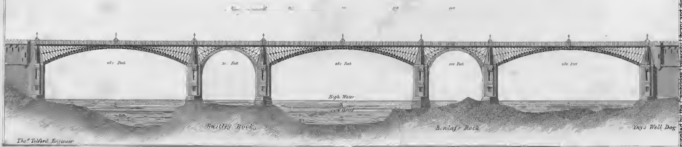
Plate III_REPORT FROM COMMITTEE ON ROADS TO HOLYHEAD; &c.

DESIGN for a BRIDGE proposed to be erected over the MENAI upon the SWILLEY ROCKS.



Thos Telford, Engineer.

Drawn by W. A. Provis

Luke Hansard & Sons, Printers

W. Lowry Sculp

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Mr. Telford's Report to Lords of Treasury, 22 April 1811.

making that 500 feet span, leaves the Navigation as free as at present. In this I have made the height 100 feet in the clear at high-water spring-tides, and I propose this Bridge to be 40 feet in breadth; eſtimating from Drawings, as already described, I find the expense to be £.127,331. or £.31,367. less than the former. From leaving the whole Channel unimpeded, it is certainly the moſt perfect scheme of passing the Menai, and it would, in my opinion, be attended with the leaſt inconvenience and risk in the execution.

In order to render this evident, I have made a Drawing to shew in what manner the centering or frame for an arch of this magnitude may be conſtructed; hitherto the centering has been made by placing supports and working from below; but in the case of the Menai, from the nature of the bottom of the Channel, the depth at low water, and the great rise and rapidity of the tides, this would be very difficult, if not impracticable. I therefore propose changing the mode, and working entirely from above; that is to say, inſtead of supporting, I mean to suspend the centering. By inspecting the Drawing, the general principle of this will be readily conceived.

I propose, in the first place, to build the masonry of the abutments as far back as the lines AB, CD, and in the particular manner ſhewn in the Section.

Having carried up the masonry to the level of the Roadway, I propose, upon the top of each abutment, to conſtruct as many frames as there are to be ribs in the centers, and of at leaſt an equal breadth with the top of each rib. These frames to be about fifty feet high above the top of the masonry, and to be rendered perfectly firm and secure. That this can be done, is so evident, I avoid entering into details respecting the mode. These frames are for the purpose of receiving ſtrong blocks, or rollers and chains, and to be acted upon by windlasses or other powers.

I next proceed to conſtruct the centering itself; it is proposed to be made of deal baulk, and to consist of four separate ribs, each rib consisting of a continuation of timber frames, five feet in width across the top and bottom, and varying in depth from 25 feet, near the abutment, to 7 feet 6 inches at the middle or crown. Next to the face of the abutment, one set of frames about 50 feet in length can, by means of temporary scaffolding and iron chain bars, be readily constructed and fixed upon the masonry offsets of the abutment, and to horizontal iron ties laid into the masonry for this purpose. A set of these frames (four in number) having been fixed againſt the face of each abutment, they are to be secured together by cross and diagonal braces; and there being spaces of only 6 feet 8 inches left between the ribs (of which these frames are the commencement) they are to be covered with planking, and the whole converted into a platform 50 feet by 40. By the nature of the framing, and from its being secured by horizontal and suspending bars, I presume every person accuſtomed to practical operations will admit that these platforms may be rendered perfectly firm and secure.

The second portion of the centering frames having been previously prepared and fitted together in the carpenter's yard, are brought in separate pieces, through passages purposely left open in the masonry, to the before-mentioned platform; they are here put together, and each frame raised by the suspending chain bars and other means, so that the end which is to be joined to the frame already fixed, ſhall reſt upon a small movable carriage: it is then to be puſhed forward, perhaps upon an iron Railroad, until the ſtrong iron forks which are fixed upon its edge, ſhall fall upon a round iron bar which forms the outer edge of the firſt or abutment frames: when this has been done, ſtrong iron bolts are put through eyes in the forks, and the aforesaid second portion of frame-work is suffered to descend to its intended position by means of the suspending chain bars, until it closes with the end of the previously fixed frame like a rule joint. Admitting the firſt frames were firmly fixed, and that the hinge part of this joint is sufficiently ſtrong, and the joint itself about 20 feet deep, I conceive that even without the aid of the suspending bars, that this second portion of the centering would be supported; but we will for a moment suppose that it is to be wholly suspended.—It is known by experiments, that a bar of good malleable iron, one inch square, will suspend 80,000lbs. and that the powers

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of suspension are as the sections; consequently a bar of 1½ inch square will suspend 180,000 lbs. but the whole weight of this portion of rib, including the weight of the suspending bar, is only about 30,000 lbs. or one-sixth of the weight that might be safely suspended; and as I propose two suspending chain bars to each portion of rib, if they had the whole to support they would only be exerting about 1-12th of their power; and considering the proportion of the weight which reſts upon the abutments, they are equal also to support all the iron-work of the Bridge, and be still far within their power.

Having thus provided for the second portions of the centering a degree of security far beyond what can be required, similar operations are carried on from each abutment until the parts are joined in the middle and form a complete centering; and being then braced together, and covered with planking where necessary, they become one general platform or wooden bridge on which to lay the iron-work.

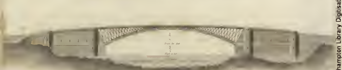
It is, I presume, needless to observe, that upon such a centering or platform the iron-work, which it is underſtood has been previously fitted, can be put together with the utmoſt correctness and facility; the communications from the shores to the centering will be through the before-mentioned passages left in the masonry

The form of the iron-work of the main ribs will be seen by the Drawings to compose a system of triangles, preserving the principal points of bearing in the direction of the radius. It is proposed in the breadth of the bridge (i. e. 40 feet) to have 9 ribs, each caſt in 23 pieces, and these connected by a cross-grated plate, nearly in the same manner as in the great Aqueduct of Pontcysylte over the valley of the Dee near Llangollen; the fixation of the several ribs in a vertical plane appearing (after the abutments) to be the moſt important object in iron Bridges, I propose to accomplish this by covering the several parts, as they are progressively fixed, with grated or reticulated and flanched plates across the top of the ribs. This would keep the tops of the Ribs immovable, and convert the whole breadth of the Bridge into one frame; besides thus securing the top, I propose also having cross braces near the bottom of the ribs.

The main ribs being thus fixed, covered and connected together, the great feature of the Bridge is completed; and as, from accurate experiments made and communicated to me by my friend the late William Reynolds of Coalbrook Dale, it requires 448,000 lbs. to cruſh a cube of ¼ inch of caſt iron of the quality called gun metal, it is clear, that while the ribs are kept in their true position, the ſtrength provided is more than ample.

When advanced thus far, I propose (though not to remove) yet to ease the timber centering, by having the feet of the centering ribs (which are supported by off-sets in the masonry of the front of the abutment) placed upon proper wedges; the reſt of the centering to be eased at the same time by means of the chain bars. Thus, the hitherto dangerous operation of ſtriking the centering, will be rendered gradual, and perfectly safe: insomuch, that this new mode of *suspending* the centering inſtead of *supporting* it from below, may perhaps hereafter be adopted as an improvement in conſtructing iron bridges, even in places not circumſtanced as are the Menai Straits. Although the span of the arch is unusually great, yet by using iron as a material, the weight upon the center, when compared with large ſtone arches, is very small; taking the mere arch ſtones of the center arch of Blackfriars bridge at 156 x 43 x 5 equal to 33,540 cubic feet of ſtone, it amounts to 2,236 tons, whereas the whole of the iron-work in the main ribs, cross plates and ties, and grated covering plates, that is to say, all that is lying on the centering at the time it is to be eased, weighs only 1,791 tons; it is true, that from the flatness of the iron arch, if left unguarded, a great proportion of this weight would reſt upon the centering; but this is counterbalanced by the operation of the iron ties in the abutments, and wholly commanded by the suspending chain bars.

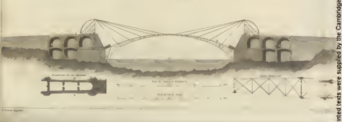
When the main iron ribs have been completed, the next ſtep is to proceed with the iron supporters of the Roadway; and these, inſtead of being conſtructed in the form of circles, or that of perpendicular pillars, as hitherto, are here a series of triangles, thus including the true line of bearing. These triangles are, of course, DESIGN for a BRIDGE proposed to be erected over the MENAI at YNYS Y MOCH



Ordered by the HOUSE OF COMMONS to be printed [illegible] May 1811

Plate II REPORT FROM COMMITTEE on ROADS to HOLYHEAD &c

DESIGN for the CENTERING for the proposed BRIDGE over the MENAI at YNYS Y MOCH.



Mr. Telford's Report to Lords of Treasury, 22 April 1811.

courſe, preſerved in a vertical plane by croſs ties and braces: iron bearers are ſupported by these triangles, and upon the bearers are laid the covering plates under the Roadway, which inſtead of being solid, are (in order to leſſen the weight) proposed to be reticulated.

If I have, throughout this very ſuccinct deſcription, made myſelf underſtood, it will, I think, be admitted, that the conſtructing a single arch acroſs the Menai, is not only a very practicable, but a very simple operation; and that it is rendered so, chiefly by adopting the mode of working from each abutment, without at all interfering with the tideway.

In the Swilly Bridge, although the arches are smaller, yet being placed on piers ſituate on rocks ſurrounded by a rapid tide, and ſpringing at a great height, the inconvenience of carrying materials and working is greatly increaſed; and ſuppoſing the Bridge part conſtructed, an enormous expenſe is ſtill to be incurred before the Roadway can be carried over the flat ground on the Angleſea ſhore. Therefore, whether economy, facility of performance, magnificence, or durability be conſulted, the Bridge of one arch is, in my opinion, infinitely preferable; and it is not leſs so, if conſidered in what regards the navigation.

From the MENAI to the TOLL-BAR.

Having croſſed the Menai, the preſent Road aſcends at the rate of 1 in 11, and deſcends at the same rate towards the town of Bangor, from whence it proceeds on the Cheſter Road with inclinations of 1 in 17, 14, and even 9, to Llandegau; it then turns at an acute angle up the valley of the Ogwen, and frequently confined between the ſteep bank of that ſtream and the slate Railway to the Toll Bar, a diſtance of near six miles, riſing sometimes 1 in 18 and 15½; its breadths between Llandegau and the Toll Bar, are 18 and 20 feet.

Under theſe circumſtances, and conſidering that the general direction is very circuitous, I have laid out a line from the intended Bridges over the Menai, which points towards the Toll Bar; and this has been conducted ſo as no inclination ſhall exceed 1 in 30, generally much leſs, and the diſtance is reduced to 5 miles 748 yards.

EXPENSE:

Road-making, cutting, banking - - - -	£.6,730	
Bridges and Drains - - - - - -	- 666	
Breaſt and retaining walls, fencing land, and damages	- 3,831	£.
		11,227

To Tyn-maes.

From the Toll Bar the preſent Road proceeds for a ſhort diſtance nearly parallel with the Rail Road, it then deſcends and croſſes the River Ogwen, and proceeds with inclinations of 1 in 17, 15, and 13, along the eaſtern bank of the river to Tyn-maes.

Inſtead of loſing level by deſcending to the Ogwen, I have choſen a line gradually aſcending, the ſteepeſt parts of which are only 1 in 40 and 50; this line is carried along the weſtern bank of the Ogwen to near Tyn-maes, where the ſtream is croſſed by one arch upon rock abutments. The diſtance is 3 miles 638 yards, being an increaſe of diſtance of about 400 yards.

EXPENSE:

Road-making, cutting and banking - - - -	£. 4,853	
Bridges and Drains - - - - - -	- 1,038	
Breaſt and retaining walls, fences, lands, &c. - -	- 2,688	£.
		8,579

To the eaſt end of Lake Ogwen.

From Tyn-maes to a ſhort diſtance eaſt of Lake Ogwen, the preſent Road paſſes along the face of a ſteep and rugged hill in ſome parts nearly level, in others with aſcents of 1 in 17, 15, and even 13; the breadth is only 21, 18 and 15, feet, and it is much expoſed from looſe ſtones falling down from the upper parts of the mountain.

To

Mr. Telford's Report to Lords of Treasury, 22 April 1811.

To render this part of the Road safe and of easy ascent, I propose to reduce the whole to one inclination, by which it will be rendered 1 in 36. In order to obtain thirty feet in breadth, it will be necessary to take the upper side of the present Road, which has been cut out of the solid, for the foundation of a breaſt wall to build this up to a proper height, and on the upper side to cut a small part out of the natural slope of the hill, which muſt of course be secured by a retaining wall. It will also be necessary to build a parapet wall upon the breaſt wall, along the whole of the lower side of the Road. By these means, a very perfect and commodious Road would be obtained. In conſtructing the breaſtworks, retaining-walls, parapets, and filling up the Roadway, a great proportion of the loose ſtones would be employed, and the reſt ſhould be thrown along the lower side of the new Road; when these fragments, which now encumber the face of the mountain, have been cleared away, many ages will not again supply an equal quantity; at the top of this ascent, a rocky point, which at present causes a ſharp bend, muſt be partly cut down, and there muſt be a new Bridge built over the Ogwen. With some alterations, the line may be continued along the South side of the Lake Ogwen. This diſtance is 3 miles 1,045 yards, being nearly the same length as the present Road.

Expense of this Division, including Bridges and Drains, breaſt walls, parapets, &c. &c. - - - - - - - -	£.18,436

To the Bridge of Llugwy.

From the eaſt end of Lake Ogwen the Road is carried on the South side of the valley, ascending and descending alternately at the rate of 1 in 19, 17, 12, and 11½. until it passes near Capel Ceriog, and from thence along the North side of the Llugwy to a Bridge which crosses that ſtream at a rocky pass.

Besides this division, as far as Capel Ceriog, being on the wrong side of the valley with regard to exposure, the surface is very irregular, ascending and descending alternately, and the Road partakes fully of the nature of the ground, I have therefore laid out the new line on the other side of the valley, always gradually descending, and so as no part has more than 1 in 38 and 52. The distance is just equal to the present line, being 11 yards ſhort of 5 miles.

Expense:

Road-making, cutting, banking, &c. - - -	£.6,819	
Bridges and Drains - - - - - - -	1,300	
Retaining walls, land, &c. - - - - - -	1,359	£.
		9,478

From the last-mentioned Bridge the present Road descends through very rough ground at 1 in 26, and then passes along a flat part of the valley to near the great water-fall, from whence to Bettws-y-coed, and even to the River Conway, the inclinations are sometimes 1 in 20, 15, and 14.

To the River Conway.

I was very desirous to have carried the line down the other side of this valley, but was deterred chiefly by the very lofty and perpendicular rocks adjacent to the water-fall, and also because a line might be laid out along the same side as the present, with the greatest inclination only 1 in 34, but generally 1 in 72 and 95. Between Bettws-y-coed and the present Bridge over the Conway, some irregular ground intervenes; partly to avoid this, but chiefly to obtain a command of the difficult ground which falls in the next division, I have crossed the River Conway, about a mile below the present Bridge; the length of the present division is 11 yards short of 5 miles.

Expense:

Road-making, cutting, banking, &c. - - -	£.6,152	
Bridges and Drains - - - - - - -	4,680	
Parapets - - - - - - - -	1,250	
Retaining and breaſt walls, fences, land, &c. - -	2,678	£.
		14,760

From

Mr. Telford's Report to Lords of Treasury, 22 April 1811.

To Rhydllanfair.

From the proposed Bridge over the Conway, to the Cross Road at Rhydllanfair, the present Road is very irregular, and, in some inſtances, as ſteep as 1 in 9½. By gaining the Eaſtern bank about a mile below the present Bridge, a command of the ground is obtained, which has enabled me to lay out a line, the ſteepeſt part of which is 1 in 30, and the reſt 1 in 60; the diſtance is 3 miles 308 yards; and this, with the laſt division, when compared with the present Road from the same extreme points, is longer by about 200 yards; but, from the very worſt, may be converted into one of the beſt parts of the Road.

EXPENSE:

Road-making	£.2,794	
Bridges and Drains	298	
Breaſt and retaining walls, parapets	6,147	
Fences, land, damages, &c.	819	£.
		10,058

To the Toll Bar.

From Rhydllanfair, to the crossing of the Conway at the Toll Bar, the Road has already in some parts been considerably improved; but to render it perfect, much ſtill remains to be done: there are inſtances of the inclinations being near 1 in 20, and the breadths 20, 18, and 15 feet only; immediately after crossing the Conway, in the middle of this division, a deviation is necessary. The proposed improvements will obtain the full width, and reduce the ascents to 1 in 36 where ſteepeſt; the diſtance is 2 miles 396 yards, which is about 50 yards more than the present Road.

EXPENSE:

Road-making, cutting, banking	£.2,421	
Bridges and Drains	158	
Retaining and breaſt-walls, fences, land, damages, &c.	1,972	£.
		4,551

To Kyrniogu Maur.

From the Conway at the Toll Bar, to the Inn at Kyrniogu Maur, the present Road is very irregular; it ascends and descends alternately, and sometimes at the rate of 1 in 22 and 20; I therefore propose to pass to the opposite, or northern side of the valley, and continue gradually, but always ascending to the Inn, the greateſt rise being 1 in 35, and that only for a small portion of the diſtance; the reſt being 1 in 50, 100, 258. The length of this division is 3 miles 550 yards, being 66 yards leſs than by the present Road.

EXPENSE:

Road-making, cutting, banking	£.4,214	
Bridges and Drains	815	
Breaſt and retaining walls, fences, land, damages, &c.	1,886	£.
		6,915

To Tynant.

After paſsing Kyrniogu, the present Road reaches its greateſt summit between the Dee and the Conway, viz. 874 feet above high-water mark spring tides, at Bangor Ferry. The Road proceeds rising and falling alternately, making a bend to the N. E. over a considerable hill at Cerrig-y-Druiddion; then, after falling down to the Gairw, and crossing and re-crossing it, passes on to Tynant. Besides these irregular and unnecessary bendings, the ascents and descents are sometimes 1 in 17 and 14.

To avoid these, it will be necessary to make several variations, particularly down the valley, to the southward of Cerrig-y-Druiddion; also, by keeping afterwards along the North side of the ſtream, to the eaſtward of that place. With these variations, and in some inſtances cutting and banking, an excellent Road may be made, with the greateſt descent only 1 in 30, but generally 1 in 40, 50, 60, 90. The diſtance from Kyrniogu is 7 miles 143 yards, being about 66 yards ſhorter than the present Road.

Mr. Telford's Report to Lords of Treasury, 22 April 1811.

EXPENSE:

Road-making, cutting, banking - - - -	£. 7,655	
Bridges and Drains - - - - - - -	1,232	
Retaining and breaſt-walls, fences, land, &c. - - -	2,858	£.
		11,745

To junction with old Road.

At Tynant, conſiderable exertions have already been made in cutting the Road out of rock which is in ſome inſtances 20 feet in height, and a very high breaſt-wall has also been built; but this Road is only from 15 to 20 feet in breadth, and muſt therefore have at leaſt one-half more added to it; the breaſt-wall and parapet muſt also be conſtructed in a ſubſtantial manner with lime mortar.

But, after leaving this Pass, the Road falls at the rate of 1 in 22½ to the Gairw, and after crossing it, ascends 1 in 17, and ſhortly after again descends at 1 in 15½.

In order to avoid these irregularities, I have continued the new line down the North side of the ſtream, descending regularly at 1 in 35 and 40, and crossing before the Gairw falls into the Alwen, have joined the present Road at the bottom of the laſt-mentioned ſteep descent. The diſtance from Tynant, by this new line, is 2 miles 902 yards, being about 308 yards more than the present Road.

EXPENSE:

Road-making, cutting, banking - - - -	£. 4,224	
Bridges and Drains - - - - - - -	1,310	
Breaſt and retaining-walls, parapets, fences, land, &c. -	2,745	£.
		8,279

To Cheſter Branch Road.

From the before-mentioned junction with the present Road, the line is continued nearly all the way along it, passing the Druid Inn, and across the Alwen; near Rug House, it reaches the point where the proposed branch to Cheſter turns off, being a diſtance of 2 miles 902 yards, although some parts of the present Road has inclinations of 1 in 18½, 19, and 20. Yet the proposed line will have none more than 1 in 44; which is effected chiefly by cutting down heights, filling up hollows, and making the Road all 40 feet in breadth.

EXPENSE:

Road-making, cutting and banking - - - - -	£. 2,701	
Bridges and Drains - - - - - - - -	495	
Retaining-walls, fences, land, &c. - - - - -	1,028	£.
		4,224

To opposite Llansantfraid.

From the point where the Cheſter Branch turns off, the present Road proceeds across the Dee at Corwen Bridge, passes through the Town of Corwen, and along South side and nearly parallel with the River to the bottom of a hill Weſt of the Toll Bar, opposite Llansantfraid and near the 8 mile-ſtone from Llangollen, where an extensive variation muſt commence. The changes in this division are the cutting down heights, filling up hollows, making the Road the full width, securing the upper side by retaining-walls, making some cross drains and fencing; some small houses at the weſtern entrance into Corwen ſhould also be removed. The distance is 3 miles 1,012 yards.

EXPENSE:

To Llandisilio.

Road-making, cutting, banking - - - - -	£. 4,553	
Bridge and Drains - - - - - - - -	540	
Retaining walls, fences, land, &c. - - - - -	1,955	£.
		7,048

From

Mr. Telford's Report to Lords of Treaſury, 22 April 1811.

To Llandiſilio.

From the bottom of the before-mentioned hill Weſt of the Toll Bar, to the ſmall woollen manufactory opposite the Canal Weir at Llandiſilio, the present Road paſses over a continual succeſsion of ſteep hills alternately rising and falling at the rates of 1 in 14, 16, 17, 18, 19. The Road is also much too narrow.

Aware that going parallel with the declivity of the River would make a Road comparatively level, that is to say, 1 in 400 or 500, I had surveys carried down both sides, but found the hills project and recede so much as to lengthen the line 2¼ miles; this appeared to be too much, if a line could be laid out, the greater proportion level and none more than 1 in 30; this has been accompliſhed by the line laid down in the Map and Section, by rising for 3-4ths of a mile 1 in 44, to clear the Glendower hill, and from thence to continue on a perfect level for 4¾ miles, pass the summit 90 feet lower than the present Road, and then to descend at 1 in 30 to the small woollen manufactory. In the course of this improvement there are two very considerable pieces of cutting, and the whole diſtance, in whatever line the Road is made, ought to be protected by a retaining-wall. The diſtance is 6 miles 847 yards, being 858 yards longer than the present line.

EXPENSE:

Road-making, cutting, banking - - - - -	£. 14,571	
Bridges and Drains - - - - - - -	3,466	
Retaining walls, fences, land, &c. - - - - -	5,672	£.
		23,709

To opposite Pontcysylte Aqueduct.

From the woollen manufactory the present Road passes over some rising ground which ſhould be avoided, because the descent from it is at 1 in 16; it next proceeds to Llangollen, which it passes through, making two turnings, both at right angles, in very narrow ſtreets; these may be avoided by continuing a direct line on the South side of the church, crossing the Brook a little higher than the present Bridge, and joining the old Road a little way Eaſt of the Toll Bar. After passing Llangollen, the present Road, until after it has passed opposite to the great Aqueduct, is not very objectionable on account of the rate of inclination, being only in one inſtance so much as 1 in 29; but it is all too narrow. By the foregoing alterations, the new line will in no place be more than 1 in 40; generally 1 in 50 and 60. The diſtance is 5 miles 1,399 yards, being 31 yards ſhorter than the present Road.

EXPENSE:

Road-making, cutting, banking - - - - -	£. 5,099	
Bridges and Drains - - - - - - - - - - -	845	
Retaining walls, fences, land, &c. &c. - - - -	3,985	£.
		9,929

From opposite the GREAT AQUEDUCT of PONTCYSYLTE, to the top of the South Bank of CHIRK VALLEY.

The present Road passes in a circuitous manner; and over such hilly ground, that the rates of ascents and descents are frequently 1 in 18, 17, 15, and even 12. There are circumſtances which render it difficult to lay out a good line in this division; Chirk Caſtle, its parks and woods, occupy the ſkirts of the hill above the village, and those of Lord Dungannon the banks immediately below it. The river Ceriog continues deep, with many bold banks, far into the country; and the Ellesmere Canal has taken possession of some of the moſt favourable ground along the base of the bill, and also a considerable portion of the Ceriog banks: under these circumſtances, it was not until after sundry trials (which are ſhewn by dotted lines on the Map) that I laid out the proposed line. This, inſtead of following the present Road to the Turnpike Gate, and then turning at an acute angle, *Mr. Telford's Report to Lords of Treasury, 22 April 1811.*

angle, is carried with a regular deſcent round the hill occupied by the old mansion called Cefn-y-Wern, and thence falling very gently down to near the upper side of the Canal, along which it passes, and crosses the Chirk Valley a little above the Canal Aqueduct. The passing this deep valley, on a level, is unavoidably expensive, but the Road having thus far been made uniformly very easy, the leaving this unimproved would be a glaring defect; I have therefore eſtimated the passing it upon a level, and find that on account of an excellent ſtone quarry being close to the spot, and lime also at a short diſtance, that ſtone arches are cheaper than an earthen mound with one arch for the River Ceriog. The length of this division is 3 miles 389 yards, being half a mile less than by the present Road.

EXPENSE:

Road-making, cutting, banking - - - - -	£. 3,968	
Common Bridges and Drains - - - - -	720	
Crossing the Ceriog Valley - - - - - -	22,016	
Retaining-walls, fences, land, &c. - - - -	1,952	£.
		28,656

To the Queen's Head.

From the South bank of Chirk Valley, to crossing the Canal at the Queen's Head, the present Road passes in a direct line to Gobowen; but there it turns nearly direct South to Oswestry, and from thence, by nearly a right angle, again returns to the Queen's Head; the diſtance is only 132 yards ſhort of 9 miles. The rises and falls are, with a very few exceptions, sufficiently easy; but the line has upon the whole risen at Oswestry about 50 feet above the level of Gobowen; the Road is also generally too narrow, being in some inſtances only 24 and 25 feet wide.

But there is now a Turnpike Road quite as good as that already described, which passes through Whittington, and in a ſtraight direction to the Queen's Head, saving about a mile and a half in diſtance. By this Road, if a proper Inn was eſtabliſhed at the Queen's Head, the space between Llangollen and Shrewsbury would be divided into two more equal stages than at present. At present, from Llangollen to Oswestry is 12 miles, and from thence to Shrewsbury 18 miles. By the proposed line from Llangollen to the Queen's Head will be 14¼ miles, and from thence to Shrewsbury 13¾ miles.

Excepting in a few inſtances which can easily be remedied, the inclinations of the Road from Chirk Bank by Whittington to the Queen's Head, are now remarkably easy; the diſtance is 7 miles 748 yards. To perfect it agreeably to the general regulations the expense would be

Road-making, cutting, banking - - - -	£. 6,534	
Bridges, Drains, &c. - - - - - - - -	296	
Fences, land, damages, &c. - - - - - -	1,610	£.
		8,440

To Shrewsbury.

From the Queen's Head to the Welſh Bridge at Shrewsbury, excepting in one inſtance a little eaſt of Nesscliff, where it is 1 in 26½, and over the Hill eaſt of Montford Bridge, where it is 1 in 22, the inclinations are in general very easy; I have ſhewn by dotted Lines, in what manner the Road from Montford Bridge might in a great measure avoid the Hill; but in the following Eſtimate I have only provided for widening the present Road, which is now only about 27 feet on average, frequently only 20; also improving it by partial cuttings and embankments, and rendering it in other respects agreeable to the general regulations. The diſtance is 13 miles 1,283 yards.

EXPENSE:

Road-making, cutting, banking - - - -	£. 14,001	
Lengthening small Bridges, Drains, &c. - - - -	1,180	
Retaining walls, fences, land, damages - - - -	5,296	£.
		20,477

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RECAPITULATION.

DIVISIONS.	Length of present Road.		Length of proposed Road.		EXPENSE.
	Miles.	Yards.	Miles.	Yards	£.
From Holyhead to Ynys-y-Moch on the Menai - - - - - -	24.	810.	21	1.014.	67,614
Crossing the Menai - - - - -	0.	726.	0.	1,100.	127,331
From D° to near the Toll Bar - -	5.	1,683.	5.	748.	11,227
— D° to Tynmaes - - - - -	3.	242.	3.	638.	8,579
— D° to East end of Lake Ogwen -	3.	1,045.	3.	1,045.	18,436
— D° to Bridge at the Rocky Pass upon the Llugwy - -	4.	1,639.	4.	1,749.	9,473
— D° to crossing the Conway - -	8.	77.	4.	1,749.	14,760
— D° to Road to Rhydllanfair - -			3.	308.	10,058
— D° to Toll Bar upon the Conway,	2.	341.	2.	396.	4,551
— D° to Kyrniogu-Maur - -	3.	616.	3.	550.	6,915
— D° to Ty'nant - - - - -	7.	209.	7.	143.	11,745
— D° to joining the Old Road -	2.	594.	2.	902.	8,279
— D° to where the Chester Branch turns off - - - - -	2.	902.	2.	902.	4,224
— D° to near 8-mile-stone East of Corwen - - - - -	3.	1,012.	3.	1,012.	7,048
— D° to Woollen Manufactory opposite the Canal Weir at Llandisilio - - -	5.	1,749.	6.	847.	23,709
— D° to opposite great Aqueduct of Pontcysyltè - - -	5.	1,430.	5.	1,399.	9,929
— D° to South Bank of Chirk Valley	3.	1,243.	3.	389.	28,656
— D° to the Queen's Head - -	8.	1,628.	7.	748.	8,440
— D° to Shrewsbury - - -	13.	1,283.	13.	1,283.	20,477
- - - -	109.	1,389.	105.	1,082.	394,480

From BANGOR FERRY to CHESTER.

The Road from Bangor to Cheſter is at preſent even more incommodious than the Shrewſbury line; the aſcents and deſcents are ſteeper; they are very frequent, and ſometimes continued for a great diſtance; theſe, and the inconvenience and riſque of Conway Ferry, form intolerable obſtacles in this communication.

In the country which occupies the ſpace between Bangor and Cheſter, the principal ſtreams run from the S. E. to N. W. and of courſe form a ſucceſſion of vallies in that direction. Of theſe vallies the chief are the Conway and the Clwyd; the rugged chain of mountains which form the weſtern ſide of the Conway valley, are only broken by the ſecondary valley which is occupied by

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the Shrewſbury line; the eaſtern side of the Conway valley is also very high ground, and there are a number of less extensive vallies between the Conway and the Clwyd. The eaſtern side of the Vale of Clwyd is likewise composed of a lofty ridge, unbroken until it has passed opposite the Town of Denbigh; here a small valley enters, but it very soon turns in a circuitous direction to towards Mold, and there is high land between it and the valley of the Dee: I am therefore satisfied, after having repeatedly and carefully examined various parts of the country, that it is either along the ſhore, or by the top of the vales of the Conway and Clwyd, that the moſt advantageous lines of communication with Cheſter are to be formed Under this conviction, I have caused correct surveys to be made in both these directions, and ſhall now proceed to discuss each separately and in detail, beginning with the Shore Road.

From BANGOR FERRY to CONWAY.

The present Road ascends from the Ferry-house, at the rate of 1 in 11, and descends towards Bangor at the same rate; from Bangor it proceeds by inclinations sufficiently easy until it reaches the Brook Cegin, into which it descends at 1 in 13, and ascends from it at 1 in 10½; it next descends into the Ogwen at 1 in 8½, and ascends from it at 1 in 16 and 10; from thence it proceeds by a succession of small irregularities, by Aber, to Penmaen-maur; here it ascends chiefly at 1 in 16, to 189 feet above the level of the Sea, and then descends at 1 in 15; from thence it continues passing over a number of irregularities 1 in 28, 22, 17, 16, and 11, to the Hill of Sychnant, which it ascends at 1 in 8, continued to 543 feet above the level of the Sea; from this height it descends at 1 in 17, 15, 12, and 9, to the Town of Conway.

To render this division as perfect as it is capable of, the line ſhould be continued along the Shrewſbury line to the top of the firſt hill, descend at 1 in 35 to the Town of Bangor, and continue along the present Road to near the Penrhyn Arms. The moſt perfect line would then be along the ſhore; but as that would pass between Penryn Caſtle and the Sea, and underſtanding it would on that account be much objected to, I have caused a line to be surveyed to the South of the present Road, crossing the Cegin and the Ogwen considerably above the present Bridges, with the greateſt inclinations not more than 1 in 33 and 66. After ascending from the valley of the Ogwen, the line descends towards Aber, at the rate of 1 in 132, and then continues very nearly level to the Marſh, Weſt of the Town of Conway, where it passes over a small ridge of land, at 1 in 33. In this mode, it is evident that, in order to avoid Penmaen-Maur and Sychnant, the Road is formed along their bases, a little above high-water mark, partly by removing fragments and cutting rock, and partly by building breaſt-works; this appears perfectly practicable, and can be only objectionable on account of the expense. Diſtance from the Shrewſbury new line to Conway 17 miles, 427 yards; being 1 mile 274 yards longer than the present line.

EXPENSE:

Road-making, cutting, banking - - - -	£.24,496	
Bridges and Drains - - - - - -	6,424	
Breaſt-walls and parapets - - - - -	13,916	
Retaining walls, fences, land, &c. - - - -	7,844	£.
		52.680

Proposed Bridge.

The Ferry at Conway, from the nature of the quicksands, the flatness of the Eaſtern shore, and other circumſtances, is more inconvenient and dangerous than that at Bangor, accordingly accidents are more frequent. Spring tides rise about 20 feet, and flow up to near Llanrwſt, and as there is an extensive space immediately above the Ferry, consequently a considerable portion of tidal water is required. Besides the rise of the tide, there is about 16 feet left in the Channel next Conway at low water, and nearly the same on the Eaſtern side of the rocky island.

Conway Ferry.

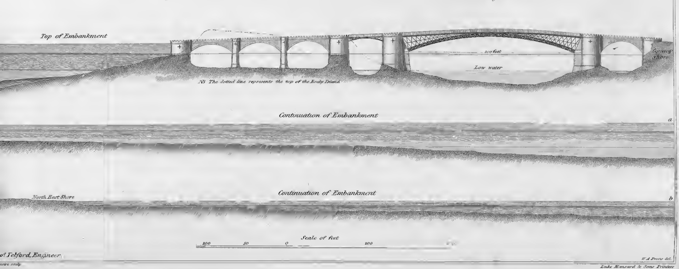
Here, in order to form a safe and commodious passage without materially interfering with the navigation of the River, I propose making one arch of caſt iron, 200 feet span, over the Channel next the Town: Abutments for this may be built upon

rock

845

Plate V. REPORT FROM COMMITTEE ON ROADS TO HOLYHEAD &c

DESIGN for a BRIDGE and EMBANKMENT for the RIVER CONWAY at the TOWN of CONWAY.



NB The dotted line represents the top of the Rocky Island

of Telford, Engineer.

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rock at low-water mark; behind the Eaſtern abutment I propose to cut away the rock somewhat under the level of low water, to form a passage for Vessels suitable for this River, and over this space I propose placing a Drawbridge. In order to obtain ſtones conveniently to form an embankment, but chiefly for creating a free passage for tidal water, which, when formed, cannot on account of being rock be changed by the current, I propose to cut away all the small rocky island, except as much as will form an abutment and wing-walls to the laſt of three arches of 50 feet span each; with these ſtones, and others which may be had from the adjacent banks, I mean to conſtruct an embankment across the Sands, to the Eaſtern Shore. This I conceive to be the ſafeſt and moſt economical mode of effecting a passage, having due regard to the navigation of the River. From my Eſtimates, the Expenſe of this amounts to £.44,178. Diſtance, 744 yards.

To Abergelle.

After crossing the Conway, the present Road ascends a small hill at 1 in 19, passes to the South side of a track of low marſhy land, which separates the Orme's Head from the main land; it then with a very quick bend turns parallel to this marſh, and continues with a succession of irregularities to ascend at 1 in 22, to a pass which separates another lesser point of land at Llandrilloyn; it afterwards goes in a tolerably regular manner for a ſhort diſtance; it then ascends at 1 in 15, and immediately descends at 1 in 20 and 11 into a deep dingle, where, after crossing the Colwyn only 28 feet above the level of the Sea, it ascends at 1 in 7, 11, and 15, until it has reached the summit of Penmun Rhos at 360 feet above the level of the Sea; from this elevation it immediately descends at 1 in 31, 10, and 14½, to Llandulas, which is only 19 feet above the Sea; from this point it again ascends at 1 in 10½, and passes afterwards by sundry small irregularities, but without any considerable obſtacle, to Abergelle.

From this description, and inspecting the Section, it will be evident that this communication can only be effectually improved by a total change; accordingly, after passing the Ferry House on the eaſtern ſhore of the Conway, and cutting about 10 feet from the summit of the before-mentioned small hill, inſtead of crossing to the south side, I continue the line along the north side to near the eaſtern end of the marſh land, and nearly in a direct and level line to the bottom of the pass at Llandrilloyn; it ascends this pass at 1 in 80 and 100; afterwards, partly level and partly 1 in 132, it reaches the Colwyn, at a point from whence the Hill of Penman Rhos is ascended at 1 in 33, and descended at 1 in 66. I was very desirous of having passed this promontory on a level from the point of crossing the Colwyn, and even to have crossed this ſtream nearer to the ſhore, but was deterred from doing so, not by the great height of the perpendicular rocks which compose the head, because being lime-ſtone the expense would have been partly defrayed by the sale of ſtone, but because on the eaſtern side of the head, from the sea dissolving and waſhing away the marly soil, and the water from the upper grounds getting behind it, the surface of the hill, for about a mile in length, and a quarter of a mile in breadth, is continually ſlipping down from the face of the Rocks which compose the nucleus of the Mountain: on this account it becomes absolutely necessary to keep upon the solid part of the hill; but the new line is at the summit of the hill, kept about 140 feet under the level of the present Road, and about half that under a line which has of late been injudiciously laid out and partly executed. After passing this hill, the proposed line proceeds to Abergelle, either upon a level or at only 1 in 252. The length of this division is 11 miles and 33 yards, being 374 yards less than the present Road.

EXPENSE:

Road-making, cutting, banking	£.17,722	
Breaſt-walls, parapets	915	
Bridges and Cross Drains	2,503	
Retaining-walls, fences, land, damages, &c.	7,326	£.
		28,466

To Holywell.

From Abergelle to Holywell, the present Road passes by St. Asaph; but inſtead of keeping between the upland and flat ground, it bends southward, and ascends at 1 in 29, 20, 16, 9, 13, 15 and 24, to the height of 396 feet above the

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the Sea, from which it descends at similar rates to St. Asaph, which is only 46 feet; from St. Asaph it immediately passes over a hill, rising at 1 in 14, and falling 1 in 8, to the level of 18 feet above the Sea; from this very low point it ascends at 1 in 18, 11, and 10, to the height of 726 feet, from which it decends at 1 in 22 and 12, and afterwards ascends and descends alternately at 1 in 17, 19, and 12, to Holywell, which, in its loweſt part, is 344 feet above the Sea.

It is needless to observe, that this division is very imperfect; between Abergelle and St. Asaph might be improved by carrying a line along the base of the Uplands, but between St. Asaph and Holywell, the eaſtern ridge of the Clwyddian hills continues very high and bold, until it has passed opposite to St. Asaph, and as far as Rhyddlan; so that, without traversing upon the face of these hills in a very awkward manner, and which would greatly lengthen the line, the ſtipulated rate of ascent cannot be obtained; but there is no occasion to do this, because, by proceeding from Abergelle to Rhyddlan by a direct line, which has already been very judiciouſly laid out and partly made, and from thence, passing the Northern extremity of the before-mentioned ridge, there is a valley which ascends very gradually by the South side of Newmarket to a summit 93 feet lower than the present Road, and which is so situated, as to admit of a very gradual and easy descent to Holywell. From Abergelle to Rhyddlan the Road is quite level; from the Bridge to the village, it may be made 1 in 30; from thence proceeds at 1 in 264, 132, and 199, to the bottom of the before-mentioned valley, which it ascends only for a very ſhort diſtance at 1 in 33, and then 1 in 62, 40, 60, and 100, and descends from the summit at the rate of 1 in 66, to the Town of Holywell; here some old houses ſhould be removed, and a passage opened in a direct line to the main street. The length of this division is 16 miles 896 yards, being 535 yards ſhorter than the present Road.

EXPENSE:

Road-making, cutting, banking - - - -	£. 20,900	
Bridges and Drains - - - - - - -	549	
Breaſt and retaining-walls, parapets, fencing land, houses, &c.	9,304	£.
		30,753

To Chester.

From Holywell to Cheſter, the present Road is quite as imperfect as in the laſt division; it ascends at 1 in 20, 12, 10, 14, 11 and 24, up the Halkin Mountain, to 700 feet above the level of the Sea, and descends by similar rates to Northop, which is 334. It then proceeds, passing some deep ravines, and ascending and descending alternately, sometimes at 1 in 18½, 12½, and 13, to Hawarden, from thence descends sometimes 1 in 12½ and 13½ to the flat land adjacent to the River Dee, upon which it continues towards Cheſter; when it passes over some gently rising ground to the southern suburb, called Handbridge, down which it descends to an old inconvenient Bridge.

But the valley of the Dee reaching from Holywell to Cheſter, and the latter place ſtanding near the level of the tideway, there appears no good reason for ascending 340 feet above the former place; I have therefore, after leaving Holywell by a little deep cutting, descended at the rate of 1 in 66, excepting for a ſhort diſtance in passing a dingle a little way eaſt of the town, where the inclinations are 1 in 33, but from thence to near the Town of Flint the descent is regularly at the rate of 1 in 100. Immediately South of that place, in passing a dingle, it is 1 in 50, and then for a small diſtance level; afterwards it proceeds descending at 1 in 100 to the ſhore of the River Dee at Oakenholt Mill, and keeps close along the ſhore to Connah's Quay; it then passes along a tolerable Road in a ſtraight direction to the Manor-house of Saltney, all nearly level, but inſtead of bending in a circuitous manner along a formed Road, it proceeds directly on to the present Road from Hawarden, which from thence to Cheſter, with some repairs, may be made an excellent Road. The length of this division is 18 miles 473 yards, being about three quarters of a mile longer than the present Road.

EXPENSE:

Road-making, cutting, banking - - - -	£. 21,930	
Bridges and Drains - - - - - - -	5,221	
Breaſt and retaining-walls, fences, land and damages - -	9,324	£.
		36,475

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RECAPITULATION.

DIVISIONS.	Length of Old Line.		Length of New Line.		EXPENSE.
	Miles.	Yards.	Miles.	Yards.	£.
From Bangor Ferry to Conway - -	16.	153.	17.	427.	52,680
Crossing the River Conway - -	0.	744.	0.	744.	44,178
Conway to Abergelle - - - -	11.	407.	11.	33.	28,466
Abergelle to Holywell - - -	16.	1,431.	16.	896.	30,753
Holywell to Chester - - - -	17.	869	18.	473.	36,475
Totals - -	62.	84.	63.	813.	192,552

BRANCH from near CORWEN to CHESTER.

Although, at the expense ſtated in the laſt section of my Report, an excellent Road may be made from Bangor to Cheſter, yet this expense being considerable, it became my duty to examine the diſtrict of country which forms the head of the Vale of Clwyd, and particularly that part alluded to by Mr. Fletcher in his evidence, as ſtated in the Second Report from the Committee on the Holyhead Roads and Harbour; aware of that gentleman's local knowledge, and his disposition to communicate information, I benefited by his explanations and advice in the Cheſter line.

To pass this upper part of the country, it has been propoſed to leave the Shrewsbury line, at or near to Cerig-y-Druiddion, in one way to proceed by Ruthin and Mold, and by another to cross the Alwen valley, fall into the head of the Clwyd, skirt the top of the vale ascending to near Llandegle, and afterwards to pass down the Nant-y-Frith valley to Cargwrle. Neither of those lines are in my opinion advisable, they cross, or are entangled in the deepeſt vallies which intersect this part of the country, and they of course pass a succession of high summits; to reduce the frequent and long continued ascents and descents to the ſtipulated rate of inclination, the line muſt be greatly extended by means of repeated traverses.

But an excellent line may be obtained by proceeding along the Shrewsbury line paſt the Druid Inn, and leaving it a little way to the eaſtward of Rug House. This line passes partly along a country Road through a diſtrict comparatively smooth, to the Raven Inn near Llandegle, and having crossed the Road from Ruthin to Wrexham, it passes considerably to the North of the rugged valley of Nant-y-frith, descending to near Pont Bloiddyn, crossing the river Allen a little to the South of Hart's Heath, and passing the ridge which forms the North bank of the Allen, it descends in nearly a direct line to the Cheſter Road, Eaſt of Hawarden, where the Mold Road also joins it; from this point to Cheſter the direction of the Road is now good.

From the Shrewsbury Road to the Raven Inn, being a distance of 10 miles 968 yards, the shape of the ground is very favourable for road-making, and accordingly the inclinations are remarkably easy, being only in three instances, and these for very short diſtances, so much as 1 in 30, but in the others only 1 in 40, 50, 60, 77, 85, 95, and so on to perfectly level; in this way it ascends to 432 feet above the point where it leaves the Shrewsbury Road; it then descends at 1 in 91, to the Raven Inn, which is 342 feet above the before-mentioned point, or nearly on a level with the Inn at Kyrniogu. To the Raven Inn.

EXPENSE:

Road-making, cutting, banking - - - -	£. 13,509	
Bridges and Drains - - - - - -	3,722	
Retaining walls, fences, land - - - - -	6,866	£.
		24,097

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To Point Bloiddyn.

From the Raven Inn the line aſcends for a ſhort diſtance at 1 in 30, afterwards 1 in 66, 54, and 35½, to the general ſummit of this part of the country, which is 220 above that near Kyrniogu; from this point it deſcends at 1 in 110, 94, 33, 38, 40, 306, 127, and 30, to Point Bloiddyn. Although the inclinations are here very eaſy, yet in ſome inſtances in this diviſion there will be conſiderable ide-cutting with ſome rock, alſo breaſt and retaining walls; the diſtance is 9 miles 748 yards.

Expense:

Road-making, cutting, banking - - - -	£. 11,842	
Bridges and Drains - - - - - - -	3,438	
Retaining-walls, fences, land - - - - - -	7,407	£.
		22,687

To the Cheſter Road.

After croſſing the Allan the line continues to deſcend for a ſhort diſtance at 1 in 40; it then aſcends at 1 in 70, 30, and 53, to the top of the before-mentioned ridge, being about 80 feet above the valley; from thence it deſcends at 1 in 46, 50, 200, 74, and 54, to the preſent Cheſter Road, the diſtance being 5 miles 396 yards.

Expense:

Road-making, cutting, banking - - - -	£. 6,869	
Bridges and Drains - - - - - - -	1,276	
Retaining-walls, fences, land - - - - - -	4,474	£.
		12,619

RECAPITULATION.

DIVISIONS.	Distance.		Expense.
	Miles.	Yards.	£.
From the Shrewsbury Road to the Raven Inn -	10.	968.	24,097
From the Raven Inn to Pont Bloiddyn - -	9.	748.	22,687
From D° to the present Chester Road - -	5.	396.	12,619
From D° to Chester Bridge - - - -	4.	836.	2,000
Totals - -	29.	1,188.	61,403

From theſe Statements, it appears that a very good Road may be made to Cheſter in this direction, at about one-third of the expenſe of that along the ſhore, but the diſtance would be increaſed about 9 ½ miles above that of the improved ſhore line.

Beſides a great ſaving in point of expenſe, there would, by adopting this Branch, be the further advantage of making upwards of 43 miles Eaſt of the Menai, and of 64 from Holyhead, common to the Shrewsbury and Cheſter lines, which would be the means of ſupporting the repairs of the Road, and alſo an eſtabliſhment of good Inns.

GENERAL RECAPITULATION.

LINES.	Distance.		Expense.
	Miles.	Yards.	£.
Holyhead to Shrewsbury - - - - -	105.	1,082.	394,480.
Menai, Shore Road to Chester - - - -	63.	813.	192,552.
From near Corwen to Chester - - - - -	29.	1,188.	61,403.

Mr Telford's
Report to
Lords of Treasury,
22 April 1811.

CONCLUSION.

From the foregoing Statements and the annexed Sections* it will appear, that although passing through a mountainous country, the communications may, from being inconvenient and dangerous, be rendered perfectly commodious and safe.

In a Road forming so extensive and general a thoroughfare, it is presumed that when taken up by the Public, the most advisable, and in the end the most economical Plan is, to lay it out as perfectly, and conſtruct it as subſtantially in the firſt inſtance, as the ſhape of the country and the nature of the works are capable of. It is upon these principles my Eſtimates are formed, and although, by prudent arrangement and management during the performance of the works, some retrenchments may possibly be made, yet I cannot advise in general statements, that the Expenses (which have all been founded on detailed data) should be taken at less than what I have ſtated.

Although the laying out the lines of Roads in the beſt directions was the sole object I had in view, yet I think it will appear that in no inſtance is any Gentleman's seat more incommoded by the proposed than by the present lines; and it so happens, that very few new inns or ſtage houses are required, from Holyhead to the Menai, being by the improved line only about 21½ miles; no house to sleep at being wanted, it will only be necessary to provide some good ſtables, and two or three small rooms, which I underſtand there will be no difficulty in eſtabliſhing. If a Bridge is conſtructed, without which the communication will ever be very imperfect, a new inn, or something like the laſt-mentioned accommodation, will be required, and the latter will, in fact, be all that is absolutely necessary; because when the Menai forms no more obſtruction than any equal portion of Road, the diſtance between Holyhead and Capel Ceriog, reduced to 38½ miles, would, upon an improved Road, be a very easy journey; but were an inn required, the Owners of the adjacent property would be led by their own intereſt to provide one. After Capel Ceriog, Kyrniogu, Corwen, and Llangollen would, as at present, be ſtages; it is only in case the Road by Whittington is adopted, that a house will be wanted at the Queen's-Head, and the property at that place is fortunately in the hands of Owners who have it sufficiently in their power to accommodate the Public. On the Shore Road to Cheſter, it is only required to adopt Rhyddlan inſtead of St. Asaph, for all the reſt would remain as at present.

If the Branch from near Corwen to Cheſter be adopted, it appears that some better accommodations at the Raven Inn, near Llandegle, will be sufficient; because, at this junction with the Shrewſbury Road, the Druid Inn is at present tolerably commodious.

Though superfluous for those accuſtomed to inspect Canal and Road Sections, yet it may here be right to ſtate, that in order to render the irregularities of the surface of the ground perceptible, it was necessary, in the Sections of these Roads, to make the heights to a scale 13 times the size of that for the lengths, and therefore the whole outline becomes to that degree caricatured; but both the present and proposed lines are laid down to the same scales, and may therefore be correctly compared; and the ratio of the inclinations being also marked in figures*, it is presumed the whole is rendered perfectly diſtinct. When it is considered that correct and minute Surveys have been taken and laid down, and Sections made of 370 miles of Road, besides 68 miles of regular trial Surveys, and much laborious perambulation performed, it will, it is truſted, be allowed that no time has been loſt in this important service, which also unavoidably includes numerous detailed Drawings and Calculations, in order to arrive at the results ſtated in the General Eſtimates of the Expense.

THOˢ TELFORD.

London, 22d April 1811.

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* Annexed to the MS. Report.

*On the Sections mentioned above.

Appendix, No. 3.

A LIST of MAILS that have not arrived in LONDON on the days when due, ſince the 5th October 1810.

Dates of Mails from Dublin.	Hour of Arrival at Holyhead.	Mail Coach always dispatched at Noon, except a Packet be in sight	Days on which the Mails have not arrived in London when due	Days on which such Mails from Dublin have arrived.	Cause of Delay.
1810:					
Oct. 6.	Oct. 7. - - - 11 P. M.	- -	Oct. 9.	Oct. 10.	Packet not arriving in time for the Mail Coach.
8.	— 10. - - - 6 P. M.	- -	11.	13.	
9.	— 12. - - - 8 P. M.	- -	12.	15.	
10.	— 12. - - - 8 P. M	- -	13.		
11.	— 13. - - 11½ A. M.	- -	14		
12.	— 14. - - - 5 P. M.	- -	15.	17.	
13.	— 15. - - - 5 A. M.	- -	16.		
15.	— 16. - - - 10 P. M.	- -	18.	19.	
16.	— 18. - - 7 25 min. A. M.	- -	19.	20.	
22.	— 23. - - - 3¾ P. M.	- -	25.	26.	
25.	— 26. - - - 4 P. M.	- -	28.	29.	
Nov. 1.	Nov. 4. - - - 4¼ P. M.	- -	Nov. 4.	Nov. 5.	
2.	— 5. - - - 3½ A. M.	- -	5.	7.	
3.			6.		
6.	— 8. - - - 5 A. M.	- -	9.	10.	
7.	— 9. - - - 4½ A. M.	- -	10.	11.	
8.	— 9. - - - 1½ P. M.	- -	11.	12.	
9.	— 10. - - - 11¾ P. M.	- -	12.	13.	
12.	— 14. - - - 10½ A. M.	- -	15.	16.	
13.	— 15. - - - 11 A. M.	- -	16.	17.	
19.	— 21. - - - 8½ A. M.	- -	22.	24.	
20.	— 22. - - - 3½ A. M.	- -	23.	24.	
24.	— 26. - - - 3½ P. M.	- -	27.	29.	
26.	— 28. - - - 5 A. M.	- -	29.	30.	
27.	— 28. - - - 7½ P. M.	- -	30.	Dec. 1.	
Dec. 1.	Dec. 2. - - - 11¾ P. M.	- -	Dec. 4.	5.	
10.	— 11. - - - 2½ P. M.	- -	13.	14	
11.	— 12. - - - 2 P. M.	- -	14.	15.	
18.	— 19. - - - 5 P. M.	- -	21.	22.	
19.	— 20. - - - 5½ P. M.	- -	22.	23.	
20.	— 21. - - - 2 P. M.	- -	23	24.	
21.	— 22. - - - 2⅜ P. M.	- -	24.	25.	
25.	— 26. - - - 9 P. M.	- -	28.	29.	
29.	Jan. 1. - - - 4½ P. M.	- -	Jan. 1.	Jan. 3.	
31.	— 3. - - - 5 A. M.	- -	3.	5.	
1811:					
Jan. 1.	— 9. - - - 4 P. M.	- -	4.	12.	
2.		- -	5.		
3.		- -	6.		
4.		- -	7.		
5.		- -	8.		
7.		- -	10.		
8.	— 9. - - - 9½ P. M.	- -	11.	12.	
9.	— 10. - - - 1½ P. M.	- -	12.	13	
10.	— 11. - - - 2 P. M.	- -	13.	14	
17.	— 18. - - - 1½ P. M.	- -	20.	21.	
18.	— 19. - - - 2¾ P. M.	- -	21.	22.	
19.	— 20. - - - 3¼ P. M.	- -	22.	23.	
23.	— 24. - - - 8 P. M.	- -	26.	27.	
24.	— 25. - - - 3 P. M.	- -	27.	28.	
28.	— 29. - - - 2½ P. M.	- -	31.	Feb. 1.	
29.	— 31. - - - 11½ P. M.	- -	Feb. 1.	3.	
30.	Feb. 2. - - - 5½ A. M.	- -	2.	4.	
31.			3.		
Feb. 2.	— 3. - - - 4¾ P. M.	- -	5.	6.	
5.	— 7. - - 1 35 min. A. M.	- -	8.	9.	
8.	— 10. - - - 7 A. M.	- -	11.	12.	
14.	— 16. - - - 3½ A. M.	- -	17.	20.	
15.	— 16. - - - 1 P. M.	- -	18.	19.	

Dates of Mails from Dublin.	Hour of Arrival at Holyhead.	Mail Coach always dispatched at Noon, except a Packet be in sight.	Days on which the Mails have not arrived in London when due.	Days on which such Mails from Dublin have arrived.	Cause of Delay.
1811:					
Feb. 16.	— 19. - - - 2½ P. M.	- -	Feb. 19.	Feb. 22.	Packet not arriving in time for the Mail Coach.
21.	— 22. - - - 4½ P. M.	- -	24.	25.	
22.	— 23. - - - 3¾ P. M.	- -	25.	26.	
23.	— 24. - - 9 40 min. P. M.	- -	26.	27.	
25.	— 26. - - - 9 P. M.	- -	28.	Mar. 1.	
27.	— 28. - - - 2 P. M.	- -	Mar. 2.	3.	
March 1.	Mar. 2. - - - 1¼ P. M.	- -	4.	5.	
6.	— 8. - - - 7½ A. M.	- -	9.	10.	
11.	— 13. - - - 12¼ P. M.	- -	14.	15	
12.	— 14. - - - 4½ P. M.	- -	15.	17	
13.	— 16. - - - 2 A. M.	- -	16.	18	
14.	— 17. - - - 8½ A. M.	- -	17.	19.	
15.	— 17. - - - 10¼ A. M.	- -	18.	19.	
20.	— 21. - - 1 20 min. P. M.	- -	23.	24.	
21.	— 22. - - - 3 P. M.	- -	24.	25.	
22.	— 24. - - - 9¼ A. M.	- -	25.	26.	
23.	— 25. - - - 5¼ A. M.	- -	26.	27.	
25.	— 27. - - - 4¾ A. M.	- -	28.	29.	
26.	— 28. - - 10 10 min. A. M.	- -	29.	30.	
27.	— 30. - - 2 20 min. P. M.	- -	30.	} April 2.	
28.	— 30. - - - 11½ P. M.	- -	31.		
29.	— 31. - - 1 20 min. A. M.	- -	April 1.	2.	
30.	April 1. - - - 12¼ P. M.	- -	2.	3.	
April 1.	— 3. - - - 1¾ A. M.	- -	4.	5.	
2.	— 3. - - 3 25 min. P. M.	- -	5.	6.	
3.	— 4. - - 8 20 min. P. M.	- -	6.	7.	
4.	— 6. - - 4 37 min. A. M.	- -	7.	8.	
5.	— 6. - - - 3½ P. M.	- -	8.	9.	
8.	— 9. - - 2 25 min. P. M.	- -	11.	12.	
9.	— 11. - - 4 45 min. A. M.	- -	12.	13.	
10.	— 11. - - - 10½ P. M.	- -	13.	14.	
12.	— 13. - - 1 25 min. P. M.	- -	15.	16.	
15.	— 16. - - 3 45 min. P. M.	- -	18.	19.	
17.	— 19. - - - 4¼ A. M.	- -	20.	21.	
18.	— 19. - - 1 45 min. P. M.	- -	21.	22.	
20.	— 22. - - 2 10 min. A. M.	- -	23.	24.	
22.	— 24. - - - 11 A. M.	- -	25.	26.	
23.	— 25. - - - 3 P. M.	- -	26.	28.	
24.	— 27. - - - 10½ A. M.	- -	27.	29.	
25.	— 27. - - - 9½ P. M.	- -	28.	30.	
26.	— 28. - - - 9½ A. M.	- -	29.	30	
27.	— 29. - - - 1 A. M.	- -	30.	May 1.	
30.	May 1. - - - 3 P. M.	- -	May 3.	4.	
May 4.	— 5. - - - 2½ P. M.	- -	7.	8	
6.	— 8. - - - 2 P. M.	- -	9.	11.	
7.	— 9. - - - 2 A. M.	- -	10.	11.	
8.	— 9. - - - 4 P. M.	- -	11.	13	

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REPORT

FROM

COMMITTEE

ON

HOLYHEAD ROADS.

Ordered, by The House of Commons, *to be printed,*
30 *May* 1811.

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